SONY

SP01380

CAMERA CONTROL UNIT

CCU-M5A
CCU-M5AP

SERVICE MANUAL

Volume 1 1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

Table of Contents

Manual Structure

Purpose of this manual 3
Related manuals 3

1. Operating Instructions

2. Installation

2-1. Connectors and Cables 2-1
2-1-1. Connector Input/Output Signals 2-1
2-1-2. Connection Conector 2-3
2-1-3. Removal of CCZ/CCTZ/CCQ/CCTQ Connector 2-3
2-1-4. Wring Diagrams for Cables 2-4
2-2. To Change the Camera Connector 26-pin to 14-pin 2-5

3. Service Overview

3-1. Board Layout 3-1
3-2. Removal/Installation of Cabinet 3-1
3-3. Replacement of Switching Regulator 3-2
3-4. Replacement of Fan 3-3
3-5. Replacement of IF-374 board 3-4
3-6. Replacement of PR-170 board 3-5
3-7. Replacement of VA-201 board 3-5
3-8. Replacement of CN-1970 3-6
3-9. Replacement of CN-2030 board 3-6
3-10. Replacement of LED-347 3-7

4. Alignment

4-1. Preparation 4-1
4-1-1. Equipments Required 4-1
4-1-2. On CCZ Cable Length 4-1
4-1-3. List of Adjustment Controls 4-1
4-1-4. Initial Setting of Switches 4-2
4-1-5. Making Tools 4-2
4-2. VBS Video Amplifier System Adjustment 4-3
4-2-1. VBS Video Level Adjustment 4-4
4-2-2. VBS Video Cable Compensation Adjustment 1 4-4
4-2-3. VBS Video Cable Compensation Adjustment 2 4-5
4-2-4. VBS Video Cable Compensation Adjustment 3 4-5
4-3. RGB Video Amplifier Adjustment 4-6
4-3-1. RGB Video Level Adjustment 4-7
4-3-2. RGB Video Cable Compensation Adjustment 1 4-8
4-3-3. RGB Video Cable Compensation Adjustment 2 4-9
4-3-4. RGB Video Cable Compensation Adjustment 3 4-10
4-4. RETURN VIDEO System (PR-170 (N)/(P) Board) Adjustment 4-11
4-4-1. SYNC CLIP Adjustment 4-12
4-4-2. Burst Offset Adjustment 4-12
4-4-3. Burst Gate Pulse Phase Adjustment 4-13
4-4-4. Burst Gate Pulse Width Adjustment 4-13
4-4-5. SYNC Cleaning Pulse Phase Adjustment 4-13
4-4-6. SYNC Cleaning Pulse Width Adjustment 4-14
4-4-7. 1/2 Killer Adjustment 4-14
4-4-8. Clamp Pulse Phase Adjustment 4-14
4-4-9. Clamp Pulse Width Adjustment 4-14
4-4-10. BIAS Adjustment 4-16
4-4-11. Gamma Adjustment 4-18
4-4-12. Chroma Level Adjustment 4-18
4-4-13. SC Phase Adjustment 4-19
4-5. PROMPT Video System (VA-201 Board) Adjustment 4-20
4-5-1. PROMPT Video Level Adjustment 4-21
4-5-2. PROMPT Video Cable Compensation Adjustment 1 4-21
4-5-3. PROMPT Video Cable Compensation Adjustment 2 4-21
4-5-4. PROMPT Video Cable Compensation Adjustment 3 4-21
4-6. Intercom System Adjustment 4-22
4-6-1. INCOM SIDE TONE Adjustment 4-22

Manual Structure

Purpose of this manual

This is the Service Manual Volume 1 of the camera control unit CCU-M5A/M5AP. This manual contains the instructions for operation and the procedures of adjustments and parts replacement and so on.

Related manuals

Besides this Service Manual Volume 1, the following manuals are availabel for this unit.

- **Service Manual Volume 2 (Available on request)**
  Part No. 9-955-229-21
  This manual describes parts list, semiconductor pin assignments, block diagrams, schematic diagrams and board layouts.
  For obtaining, contact your local Sony Sales Office/Service Center.

- **"Semiconductor Pin Assignments" CD-ROM (Available on request)**
  This "Semiconductor Pin Assignments" CD-ROM allows you to search for semiconductors used in Communication System Solutions Network Company equipment.
  Semiconductors that cannot be searched for on this CD-ROM are listed in the service manual for the corresponding unit. The service manual contains a complete list of all semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

SONY

3-204-043-11(1)

Camera Control Unit

Section 1
Operating Instructions

This section is extracted from operation manual.

CCU-M5A
CCU-M5AP

© 2000 Sony Corporation

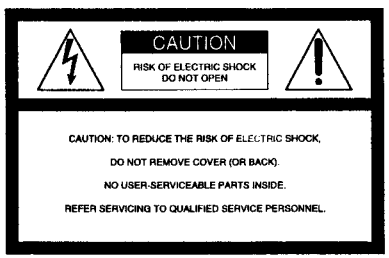
English

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

WARNING
THIS APPARATUS MUST BE EARTHED.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Owner's Record

The model and serial numbers are located at the rear. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. _____ Serial No. _____

For the customers in the USA (CCU-M5A)
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

For the customers in Europe (CCU-M5AP)
This product with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.
Compliance with these directives implies conformity to the following European standards:
- EN60065: Product Safety
- EN55103-1: Electromagnetic Interference (Emission)
- EN55103-2: Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environment(s):
E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio).

Table of Contents

Overview 4
Product Features 4
Functions Using the CCU-M5A/CCU-M5AP 4
Rack Mounting 5
How to Use the Stands 5
Connections 6
When Using an RM-M7G Remote Control Unit 8
Location and Function of Parts 9
Front Panel 9
Rear Panel 13
Notes on Use 15
Specifications 16

GB English

Overview

Product Features

The CCU-M5A/M5AP is a camera control unit that works with various color video cameras including DXC-327B series, DXC-D35 series, DXC-D35WS series, DXC-D30 series, and DXC-D30WS series via the camera adaptor such as CA-537/537P. The features of this product are described below.

Remote adjustment of camera operating parameters

The unit allows you to remotely set camera parameters, such as the automatic or manual settings of white balance, black balance, and lens iris, the gain level of the video amplifier, and the pedestal level.

Support of various input and output signals

In addition to conventional composite video signals (VBS), the unit outputs component video signals and S-video signals (RGB video signal output can be selected through an output switch on the rear of the unit). An input connector for an external sync signal is also provided.

Built-in cable compensation circuit

A built-in circuit provides compensation for bandwidth loss that occurs during transmission through high-frequency components and for drops in signal level for cable extensions of up to 300 meters (about 999 feet). In the case of composite video signals (VBS), fine adjustment can be done independently for the luminance signal and chrominance signal, respectively.

Return video and teleprompter signals

The unit allows the input and monitoring in the camera's viewfinder of return video signals from a special effects generator or control console, and provides connectors for the reception and relay of teleprompter signals.

Tally/intercom function

A tally/intercom function allows the operator of the control unit, the camera person, and the control console operator to communicate with one another.

Rack mounting

The unit can be mounted in a standard EIA 19-inch rack.

Functions Using the CCU-M5A/ CCU-M5AP

Output signals

Camera or camera and camera adaptor	Output signal			
	VBS	RGB	S-video	Y/R-Y/B-Y
DXC-D35/D35P with CA-537/537P	Yes	Yes	Yes	Yes
DXC-D30/D30P with CA-537/537P	Yes	Yes	Yes	Yes
DXC-637/637P with CA-537/537P	Yes	Yes	Yes	Yes
DXC-537A/537AP with CA-537/537P	Yes	Yes	Yes	Yes
DXC-327B/327BP with CA-537/537P	Yes	Yes	Yes	Yes
DXC-950/950P	Yes	Yes[a]	Yes[b]	No
DXC-9000/9000P	Yes	Yes[a]	Yes[b]	No

a) When the CCTZ-3RGB or CCTQ-3RGB camera cable is used.
b) When the CCTZ-3YC camera cable is used.

Items to be adjusted

Camera	Items to be adjusted			
	DETAIL	SHUTTER	C.SCAN	KNEE
DXC-D35/D35P	Yes	Yes	Yes	Yes
DXC-D30/D30P	Yes	Yes	Yes	Yes
DXC-637/637P	Yes	Yes	Yes	Yes
DXC-537A/537AP	Yes	Yes	No[a]	No[b]
DXC-327B/327BP	Yes	Yes	No	No[b]
DXC-950/950P	Yes	Yes	Yes	No
DXC-9000/9000P	Yes	Yes	Yes	No

a) Clear Scan function can be used on the camera.
b) The figures displayed on the monitor screen change but adjustments cannot be made.

Return video signal and teleprompter signal output

Camera adaptor	Return video signal output	Teleprompter signal output
CA-537/537P[a]	Yes	Yes
CA-537/537P[b]	No[c]	No

a) Serial number 20891 and higher (CA-537) or 52201 and higher (CA-537P)
b) Serial number 20890 and lower (CA-537) or 52200 and lower (CA-537P)
c) To output the return video signal, change the setting of an internal switch in the unit. For details, consult your Sony dealer or service personnel.

Length of the camera cable

When the CCZ-An camera cable is used

When and optional CCZ-An (n means the cable length in meters) camera cable is used, the cable can be extended up to 300 meters (about 999 feet). To extend the cable, set the CABLE COMP selector on this unit to the appropriate position according to the length of the cable to be used.

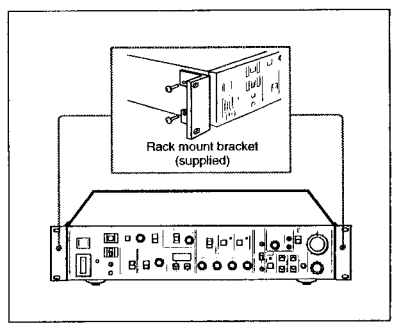
When the CCQ-nAM camera cable is used

When the CCQ-nAM camera cable is used, the maximum cable length is 100 meters (about 333 feet).

Rack Mounting

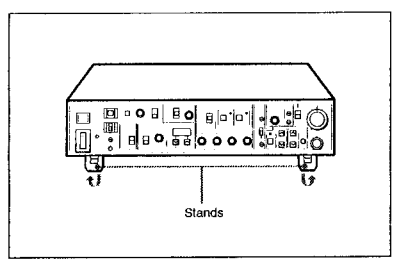
When the rack mount brackets (supplied) are attached to the CCU-M5A/M5AP, the unit can be mounted in a 19-inch standard rack.

For details on rack mounting, consult your Sony dealer or service personnel.



How to Use the Stands

Stands are provided on the bottom of the CCU-M5A/M5AP. When the unit is used on a table, turning the stands as shown below will allow easy operation.



Connections

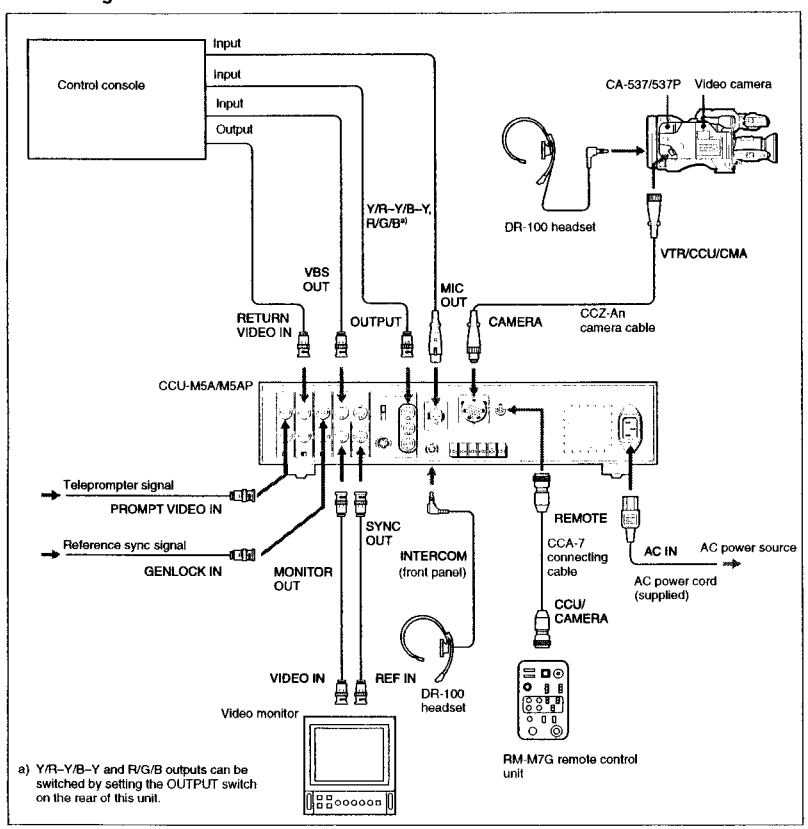
Examples of how to connect other devices to this unit are shown in the following.

Notes

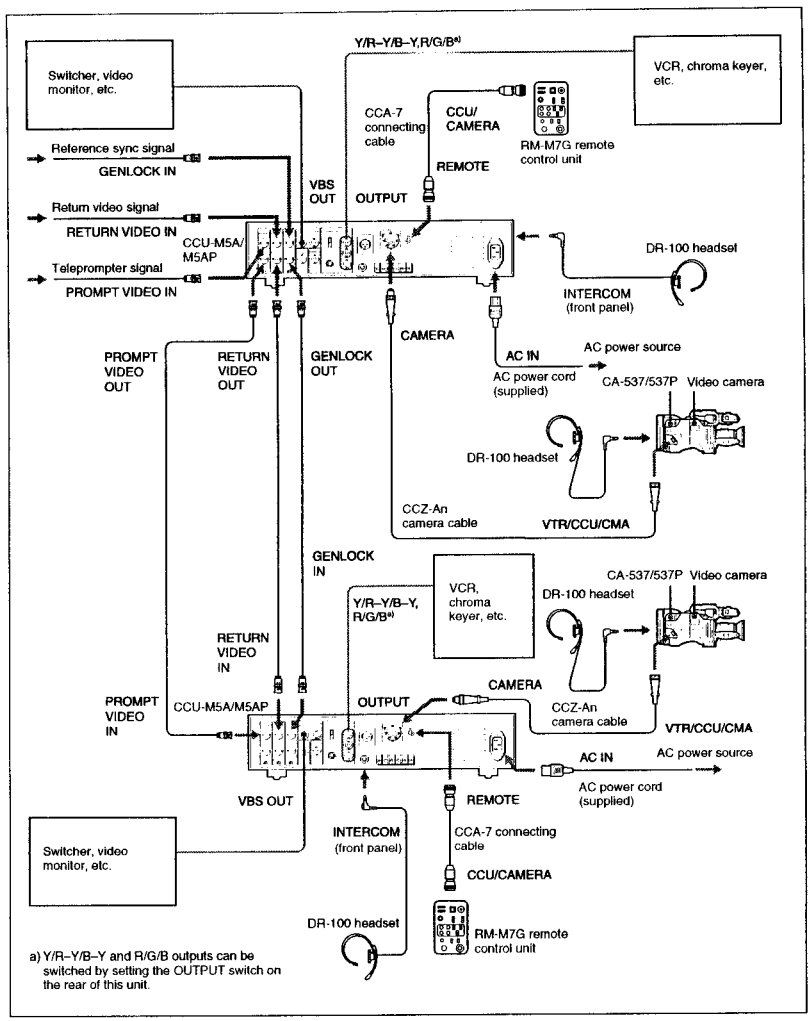
- Be sure to turn off the power to the CCU-M5A/M5AP before connecting or disconnecting the camera cable.
- Some of the video camera's switches and buttons may not operate while the CCU-M5A/M5AP is connected to it.

For details, see the operation instructions for the video camera or camera adaptor.

When using one CCU-M5A/M5AP unit



When using two CCU-M5A/M5AP units



When Using an RM-M7G Remote Control Unit

When an RM-M7G Remote Control Unit is connected to the CCU-M5A/M5AP, you can control the video camera with the RM-R7G. The remote control unit can also be connected directly to the video camera. When this unit is turned on, the camera is controlled with the CCU-M5A/M5AP. To control the camera with the RM-M7G, do the procedure below:

1 Make the following preparations on the CCU-M5A/M5AP:
- Set the OUTPUT switch on the rear panel to the appropriate position according to the connected video equipment.
- Set the CABLE COMP selector according to the length of the cable.

2 Make the following preparations on the RM-M7G:
- Press the PANEL ACTIVE button.
- Set the CAMERA SELECT switch to "1."

To control the camera with the CCU-M5A/M5AP

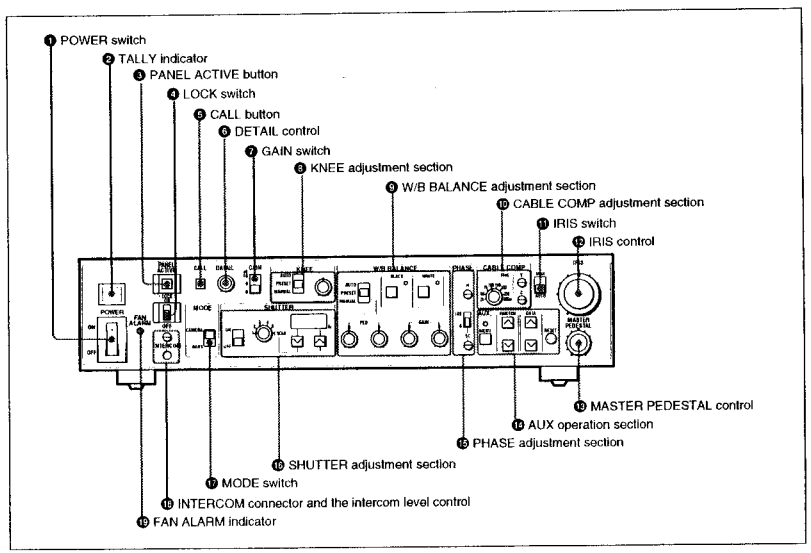
Press the PANEL ACTIVE button on the CCU-M5A/M5AP.

Notes

- The PANEL ACTIVE button on the RM-M7G may not function if you press it while you are operating this unit. In such a case, complete the operation first, then press the PANEL ACTIVE button.
- When the DXC-950 series Color Video Camera is used, the RM-M7G cannot be connected to this unit.

Location and Function of Parts

Front Panel

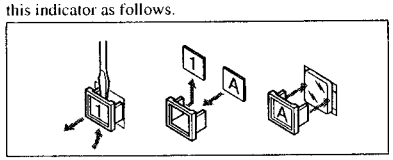


❶ POWER switch

This switches the power to this unit on or off.
ON: Turns on the power.
OFF: Turns off the power.

❷ TALLY indicator

Lights red when a red tally signal is received (i.e., the video camera connected to this unit is selected on the control console or the special effects generator).
The indicator also lights red when the CALL button is pressed on the video camera or this unit.
The camera number plate (supplied) can be attached to this indicator as follows.



❸ PANEL ACTIVE button

When the video camera connected to this unit is being controlled by more than one device (e.g., another CCU-M5A/M5AP Camera Control Unit or a RM-M7G Remote Control Unit), pressing this button causes this button to light up and to assume control of the camera. The controls on this unit operate while the button is lit.
When the PANEL ACTIVE button on another camera control device is pressed, the button on this unit turns off and its control of the camera stops.

❹ LOCK switch

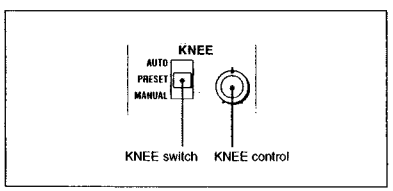
Use this switch to lock or unlock the controls on this unit.
ON: All controls (except the CALL button, INTERCOM level control, CABLE COMP control, and FINE control) are locked.
OFF: All controls are unlocked. Keep the switch in this position under normal conditions.

❺ CALL button
Press to call the camera operator over the intercom. When this button is pressed, the TALLY indicator in the camera's viewfinder and on this unit lights up.

❻ DETAIL control
Rotate to adjust the contours of objects.

❼ GAIN switch
Use this switch to set any of three video amplifier gain levels (18, 9, or 0 dB). Normally, set this switch to 0. When the lighting on object is low, set it to 9 or 18.

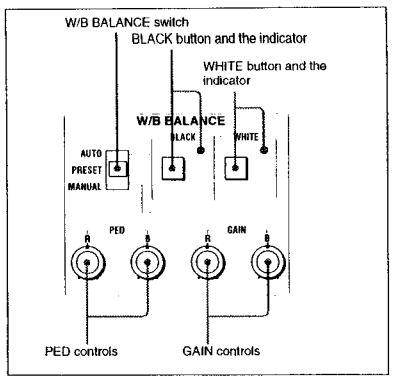
❽ KNEE adjustment section



KNEE switch
Use this switch to adjust the knee setting.
AUTO: The auto knee circuit activates and automatically adjusts the knee point to the optimum level.
PRESET: Knee point is adjusted to factory-preset level.
MANUAL: Knee point can be set manually using the KNEE control.

KNEE control
When the KNEE switch is set to MANUAL, rotate this control to set the knee point.

❾ W/B BALANCE adjustment section



W/B BALANCE (white/black balance adjustment mode) switch
Use this switch to select the white and black balance adjustment mode.
AUTO: This sets auto adjustment mode. It enables the white and black balance to be automatically adjusted using the WHITE and BLACK buttons. The adjusted values are stored in memory in the camera and are called up when the switch is set to this position again.
PRESET: This sets preset mode. The camera operates with the factory-preset white balance (i.e., white balance adjusted for iodine lamps (color temperature 3200 K) with the FILTER selector of the camera set to "1" position).
MANUAL: Sets manual adjustment mode. It enables the white and black balance to be manually adjusted using the PED and GAIN controls.

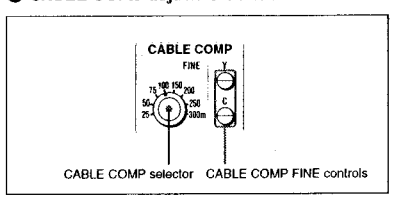
BLACK (black balance automatic adjustment) button and the indicator
Use to adjust the black balance automatically.
Press this button while the W/B BALANCE switch is set to AUTO or PRESET. When the adjustment is completed, the indicator lights up for about five seconds and turns off.

WHITE (white balance automatic adjustment) button and the indicator
Use to adjust the white balance automatically.
Press this button while the W/B BALANCE switch is set to AUTO. When the adjustment is completed, the indicator lights up for about five seconds and turns off.

PED (pedestal level) controls
Use to adjust the pedestal level.
Rotate these controls while the W/B BALANCE switch is set to MANUAL. The R control adjusts the red component and the B control adjusts the blue component.

GAIN (video gain) controls
Use to adjust the video output level.
Rotate these controls while the W/B BALANCE switch is set to MANUAL. The R control adjusts the red component and the B control adjusts the blue component.

❿ CABLE COMP adjustment section



CABLE COMP (cable compensation) selector
Set this selector to the position according to the length of the camera cable to be used. The internal cable compensator performs compensation according to the position of this selector to eliminate signal degradation. Set the selector to "25" when the camera cable length is 10 meters (about 33 feet) or less.

CABLE COMP FINE (cable compensation fine adjustment) controls
These controls are for fine adjustment of the cable compensation level of the video signal output from thew VBS OUT connectors.
If fine adjustment is required after setting the CABLE COMP selector, rotate these controls using a screwdriver. The Y control adjusts the Y (luminance) signal level and the C control adjusts the C (chrominance) signal level.

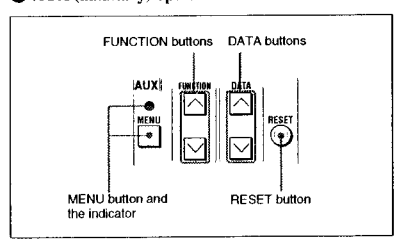
⓫ IRIS (iris adjustment mode) switch
Use this switch to select the iris adjustment mode. Be sure that the IRIS switch on the video camera is set to AUTO.
MAN: Iris is adjusted manually with the iris adjustment control.
AUTO: Iris is automatically adjusted.

⓬ IRIS (iris adjustment) control
When the IRIS switch is set to MAN, rotate this control to manually adjust the iris.
When the IRIS switch is set to AUTO, rotate this control to manually fine-tune the automatic iris adjustment.

⓭ MASTER PEDESTAL (master pedestal level adjustment) control
Use to adjust the master pedestal (master black) level setting. The master pedestal level is normally not stored in the camera. However, when the DXC-M7/M7P Color Video Camera is connected, the master pedestal level can be stored by setting an internal switch in the camera.

For details, refer to the operation manual of the video camera.

⓮ AUX (auxiliary) operation section



MENU button and the indicator
When this button is pressed, the indicator lights up and the menu items that are adjusted by the FUNCTION, DATA, and RESET buttons appear on the monitor connected to the MONITOR OUT connector. Pressing this button again turns the indicator off and causes the current settings made on the unit to appear on the monitor. Press this button again to make this information to disappear.

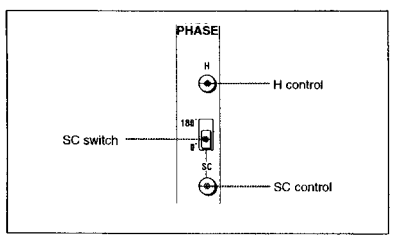
Location and Function of Parts

FUNCTION buttons
Use these buttons to move the arrow cursor up and down to specific menu items displayed on the monitor.

DATA buttons
Use these buttons to change the setting of displayed menu items that have been selected by the FUNCTION buttons.

RESET button
Press this button to reset menu items that have been selected by the FUNCTION buttons to their factory settings.

⑮ PHASE adjustment section

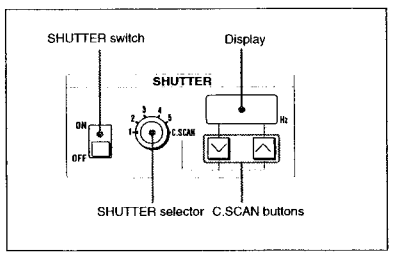


H (horizontal phase adjustment) control
Using a screwdriver, rotate this control to adjust the horizontal phase difference between the external sync signal and the signal output from this unit.

SC (subcarrier phase adjustment) switch
Set to adjust the subcarrier phase difference between the external sync signal and the signal output from this unit.

SC (subcarrier phase adjustment) control
After setting the SC switch to the appropriate position, rotate this control using a screwdriver to make fine adjustment of the subcarrier phase difference.

⑯ SHUTTER adjustment section



SHUTTER switch
Use to activate or deactivate the electronic shutter.
ON: Activates the electronic shutter.
OFF: Deactivates the electronic shutter.

SHUTTER selector
Use to select the speed of electronic shutter.

SHUTTER selector position	Shutter speed
1	1/100 sec. (NTSC), 1/60 sec. (PAL)
2	1/250 sec.
3	1/500 sec.
4	1/1000 sec.
5	1/2000 sec.
C.SCAN	Activates the Clear Scan function.

C.SCAN (Clear Scan) buttons
When the SHUTTER switch is set to C.SCAN, press these buttons repeatedly to select the Clear Scan frequency. If the SHUTTER switch is set to ON, the setting is stored in memory and retained even the power of this unit is turned off.

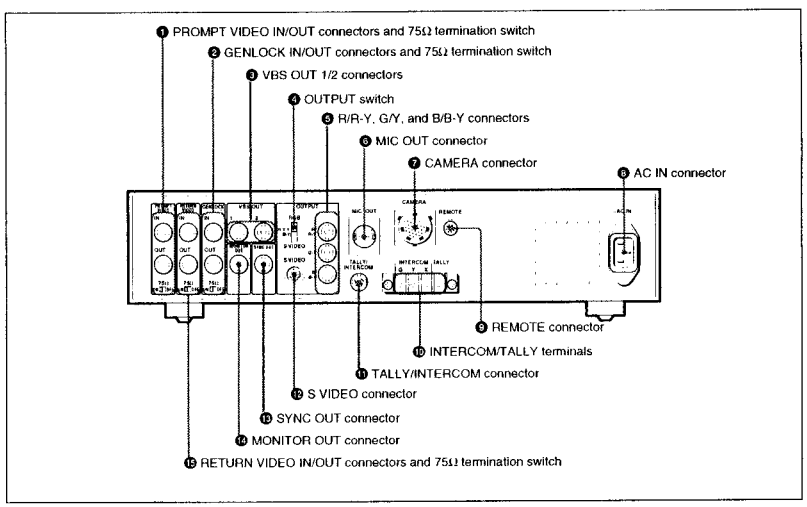
Display
Displays the selected shutter speed or Clear Scan frequency. "OFF" is displayed when the SHUTTER switch is set to OFF.

⑰ MODE switch
Use to select the video signal to be output from this unit.
CAMERA: Image being shot via video camera
BARS: Color bars generated by this unit

⑱ INTERCOM connector (minijack) and the intercom level control
Connect the DR-100 Headset to this connector and rotate the intercom level control with a screwdriver to adjust the intercom level.

⑲ FAN ALARM indicator
A cooling fan is built into this unit. If the fan should fail, this indicator flashes. Immediately switch off the power, and consult your Sony dealer or service personnel for repair. Continuing to use the unit when the fan is defective may shorten the life of the equipment.

Rear Panel


❶ PROMPT VIDEO IN/OUT connectors and 75Ω termination switch
❷ GENLOCK IN/OUT connectors and 75Ω termination switch
❸ VBS OUT 1/2 connectors
❹ OUTPUT switch
❺ R/R-Y, G/Y, and B/B-Y connectors
❻ MIC OUT connector
❼ CAMERA connector
❽ AC IN connector
❾ REMOTE connector
❿ INTERCOM/TALLY terminals
⓫ TALLY/INTERCOM connector
⓬ S VIDEO connector
⓭ SYNC OUT connector
⓮ MONITOR OUT connector
⓯ RETURN VIDEO IN/OUT connectors and 75Ω termination switch

❶ PROMPT VIDEO (teleprompter video signal) IN/OUT connectors (BNC type) and 75Ω termination switch
The IN connector accepts the teleprompter video signal. The IN and OUT connectors are loop-through and the signal input from the IN connector is directly output to the OUT connector.
When no external device is connected to the OUT connector, set the 75Ω termination switch to ON.

❷ GENLOCK (generator lock) IN/OUT connectors (BNC type) and 75Ω termination switch
The IN connector accepts the reference sync signal (black burst signal or composite video signal) for external synchronization. The IN and OUT connectors are loop-through and the signal input from the IN connector is directly output to the OUT connector.
When no external device is connected to the OUT connector, set the 75Ω termination switch to ON.

❸ VBS (composite video signal) OUT 1/2 connectors (BNC type)
Use these connectors to output signals from a video camera as composite video signals. The same signal is output from both 1 and 2 connectors.

❹ OUTPUT switch
Use this switch to select the type of the signal to be output from the R/R-Y, G/Y, B/B-Y connectors or the S VIDEO connector.

R/G/B: The R, G, and B color signals are output from the R/R-Y, G/Y, and B/B-Y connectors, respectively. No signal is output from the S VIDEO connector at this time.

R-Y,Y,B-Y: The R-Y, Y, and B-Y component signals are output from the R/R-Y, G/Y, and B/B-Y connectors, respectively. No signal is output from the S VIDEO connector at this time.

S VIDEO: The S-video signal is output from the S VIDEO connector. No signals are output from the R/R-Y, G/Y, and B/B-Y connectors at this time.

❺ R/R-Y, G/Y, and B/B-Y (component video signal/RGB signal output) connectors (BNC type)
Use these connectors to output the signals from the video camera as RGB color signals or component signals (R-Y, B-Y, and Y).

❻ MIC OUT (microphone output) connector (XLR 3-pin)
Use this connector to output microphone signal from the connected video camera.

❼ CAMERA connector (Z-type 26-pin)
Connect a camera cable here to connect this unit to the CA-537/537P Camera Adaptor attached to a video camera.

❽ AC IN connector
Use this connector to connect an AC power source via the supplied power cord.

❾ REMOTE (remote control unit) connector (10-pin)
Use this connector to connect the RM-M7G Remote Control Unit using a CCA-7 connecting cable (not supplied).

❿ INTERCOM/TALLY terminals (screw terminals)
Use these terminals to connect an intercom system which cannot be connected to ⓫ TALLY/INTERCOM connector (DIN 4-pin).

⓫ TALLY/INTERCOM connector (DIN 4-pin)
Intercom signals and tally signals are input and output via this connector. Connect to the intercom system's INTERCOM/TALLY connector using a CCDD-2.5 tally/intercom cable (not supplied).

⓬ S VIDEO (S-video signal output) connector (mini DIN 4-pin)
Use this connector to output S-video signal from the video camera.

⓭ SYNC OUT (sync signal output) connector (BNC-type)
This connector outputs the sync signal from the video camera.

⓮ MONITOR OUT (picture monitor output) connector (BNC-type)
Use this connector to output the composite video signal to a video monitor. When the MENU button on the front panel of this unit is pressed, information on the settings made in the AUX operations section of this unit can be added to the output signal.

⓯ RETURN VIDEO (return video signal) IN/OUT connectors (BNC type) and 75Ω termination switch
The IN connector accepts the on-the-air signal or signal currently being recorded from a control console or a special effects generator, and the OUT connector supplies the same signal to the viewfinder of the camera. The IN and OUT connectors are loop-through connectors, with the signal input from the IN connector being directly output to the OUT connector. When no external device is connected to the OUT connector, the 75Ω termination switch should be set to ON.

Notes
- When the return video signal is input from the RETURN VIDEO IN connector, be sure to input the sync signal from the GENLOCK IN connector.
- The signal input from the RETURN VIDEO IN connector must be synchronized with the signal input from the GENLOCK IN connector. Otherwise, camera synchronization may be unstable.

Notes on Use

Use and storage locations
Avoid using or storing the unit in the following places:
- Where it is subject to extremes of temperature.
- Near a heat source, such as a radiator or an air duct, or in a place subject to direct sunlight. (Note that in summer the temperature in a car with the windows closed can reach 50°C (122°F).)
- Very damp or dusty places.
- Where rain is likely to reach the unit.
- Places subject to severe vibration.
- Near strong magnetic fields
- Near transmitting stations generating strong radio waves.

Avoid violent impacts
Dropping the unit, or otherwise imparting a violent shock to it, is likely to cause it to malfunction.

Do not cover with cloth
While the unit is in operation, do not cover it with a cloth or other material. This can cause the temperature to rise, leading to a malfunction.

After use
Turn the unit off.

Care
If the body of the unit is dirty, wipe it with a dry cloth. For severe dirt, use a soft cloth steeped in a small amount of neutral detergent, then wipe dry. Do not use volatile solvents such as alcohol or thinners, as these may damage the finish.

Regarding the transport of this unit
Keep the original carton and associated packing material, and use them when transporting the unit. During transport, do not subject the unit to strong shocks.

Specifications

General

Power requirements
CCU-M5A: 100 to 120 V AC, 60 Hz
CCU-M5AP: 220 to 240 V AC, 50 Hz
Rated maximum load to camera
2.5 A, 12 V (at receiving end)
Power consumption
88 W
Operating temperature
5°C to 40°C (41°F to 104°F)
Peak inrush current
(1) Power ON, current probe method: 84 A (240 V)
(2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 16 A (230 V)
Dimensions (w/h/d, excluding protruding parts)
424 × 88 × 283 mm (16 3/4 × 3 1/2 × 11 1/4 inches)
Mass About 6.6 kg (14 lb 9 oz)

Output connectors

VBS OUT 1/2 BNC type (1 each)
VBS: 1.0 Vp-p, negative-sync, 75 Ω, unbalanced
S VIDEO Mini DIN 4-pin (1)
Y: 1.0 Vp-p, negative-sync, 75 Ω, unbalanced
C: 286 mV (CCU-M5A)/300 mV (CCU-M5AP) (burst), no sync
Y/R–Y, G/Y, B/B–Y
BNC type (1 each) (switchable)
R, G, B: 0.7 Vp-p, 75 Ω
Y: 1.0 Vp-p, negative-sync, 75 Ω, unbalanced
R–Y/B–Y: 0.7 Vp-p (CCU-M5A)/525 mVp-p (CCU-M5AP), 75 Ω, unbalanced
SYNC OUT BNC type (1)
4 Vp-p, 75 Ω, negative polarity
MONITOR OUT BNC type (1)
VBS: 1.0 Vp-p, negative-sync, 75 Ω, unbalanced
MIC OUT XLR 3-pin, male (1)

Input/output connectors

GENLOCK IN/OUT
BNC type (1 each, loop-through)
VBS (1.0Vp-p) or black burst (0.45 Vp-p), with a 75 Ω termination switch
CAMERA 26-pin (1)
TALLY/INTERCOM
DIN 4-pin
INTERCOM/TALLY
Screw terminals (4)
INTERCOM Minijack (1)
REMOTE 10-pin (1)
RETURN VIDEO IN/OUT
BNC type (1 each, loop-through)
VBS (1.0Vp-p) with a 75 Ω termination switch
PROMPT VIDEO IN/OUT
BNC type (1 each, loop-through)
VBS (1.0Vp-p) with a 75 Ω termination switch

Adjustable items

Iris Automatic/manual
White balance Automatic/manual/preset
R/B component levels adjustable
Black balance Automatic/manual
R/B component levels adjustable
Video amplifier gain level
Master pedestal level
Knee point Automatic/manual/preset
Detail level
Electronic shutter speed
Clear Scan
Video output signal selection
Camera/color bar
Tally/intercom level
SC phase
H phase
Cable compensation

Accessories supplied

Rack mount brackets (2)
Screws for rack mounting (4)
AC power cord (1)
Number plates (1 set)
Operation Manual (1)
Warrenty card (1)

Optional accessories

Color video camera

DXC-D35/D35P, DXC-D35WS/D35WSP, DXC-D30/D30P, DXC-D30WS/D30WSP, DXC-637/637P, DXC-537A/537AP, DXC-327B/327BP, DXC-950/950P, DXC-9000/9000P

Studio system devices

Remote control unit
RM-M7G
Headset DR-100
Camera cable CCZ-A2 (2 meters, about 7 feet), CCZ-A5 (5 meters, about 17 feet), CCZ-A10 (10 meters, about 33 feet), CCZ-A25 (25 meters, about 83 feet), CCZ-A50 (50 meters, about 166 feet), CCZ-A100 (100 meters, about 333 feet)
Extension adaptor for CCZ-A series camera cable
CCZZ-1B (fixed on the wall), CCZZ-1E
Tally/intercom cable
CCDD-2.5

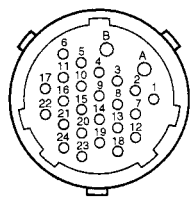
Design and specifications are subject to change without notice.

Section 2
Installation

2-1. Connectors and Cables

2-1-1. Connector Input/Output Signals

CAMERA (26P FEMALE)



(External view)

No.	Signal	Specifications
A	EXT DC (CCZ) OUT (X)	10.5 to 17.0 Vdc, 2.5 A
B	EXT DC OUT (G)	GND for POWER
1	EN VIDEO IN (X)	VBS = 1.0 V p-p ±10 % Zo = 75 Ω ±5 % DC = 0 ±200 mV
2	EN VIDEO IN (G)	GND for EN VIDEO
3	G/Y/Y VIDEO IN (G)	GND for G/Y
4	G/Y/Y VIDEO IN (X)	VS = 1.0 V p-p ±2 % Zo = 75 Ω ±5 % DC = 0 ±200 mV
5	R/R-Y/C VIDEO IN (X)	V = 714/700/286 mV p-p (BURST) ±2 % (75 % COLOR BARS) Zo = 75 Ω ±5 % DC = 0 ±200 mV
6	R/R-Y/C VIDEO IN (G)	GND for R/R-Y/C
7	B/B-Y VIDEO IN (X)	V = 714/700 mV p-p ±2 % (75 % COLOR BARS) Zo = 75 Ω ±5 % DC = 0 ±200 mV
8	B/B-Y VIDEO IN (G)	GND for B/B-Y
9	MIC OUT (X)	−60 dBm/−20 dBm Zo ≦ 600 Ω BALANCED
10	MIC OUT (Y)	
11	MIC OUT (G)	
12	TALLY OUT	Zi ≧ 600 Ω
13	S DATA IN/OUT	Zi ≧ 10 kΩ 4.5 ±0.5 Vdc 0 ±0.5 Vdc
14	(Spare)	
15	(Spare)	
16	RET & GEN OUT (G)	GND for RET & GEN
17	INCOM GND	GND for AUDIO MONITOR
18	RET & GEN OUT (X)	VBS = 1.0 V p-p Zi = 75 Ω ±5 % DC = 0 ±200 mV
19	RET & GEN OUT (G)	GND for RET & GEN
20	(Spare)	
21	RET & GEN OUT (X)	VBS = 1.0 V p-p Zi = 75 Ω ±5 % DC = 0 ±200 mV
22	(Spare)	
23	INCOM (X)	Zo = 600 Ω
24	INCOM (Y)	

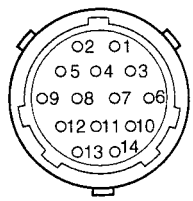
Note

The signal input to the following pins varies according to setting of the OUTPUT (video signal changeover) switch on the rear panel of the CCU-M5A/M5AP.

No.	GBR	Y, B-Y, R-Y	S VIDEO
1	EN VIDEO IN (X)	EN VIDEO IN (X)	EN VIDEO IN (X)
2	EN VIDEO IN (G)	EN VIDEO IN (G)	EN VIDEO IN (G)
3	G VIDEO IN (G)	Y VIDEO IN (G)	Y VIDEO IN (G)
4	G VIDEO IN (X)	Y VIDEO IN (X)	Y VIDEO IN (X)
5	R VIDEO IN (X)	R-Y VIDEO IN (X)	CHROMA VIDEO IN (X)
6	R VIDEO IN (G)	R-Y VIDEO IN (G)	CHROMA VIDEO IN (G)
7	B VIDEO IN (X)	B-Y VIDEO IN (X)	–
8	B VIDEO IN (G)	B-Y VIDEO IN (G)	–

CAMERA (14P FEMALE)

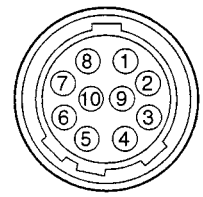
(In connection with CN-1971 board)



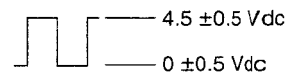
(External view)

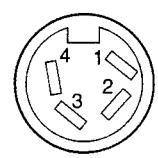
No.	Signal	Specifications
1	GND	
2	+13 V OUT	10.5 to 17.0 Vdc, 2.5 A
3	INCOM (X)	Zo = 600 Ω
4	INCOM (Y)	
5	INCOM/R/G/B GND	
6	EN VIDEO IN (X)	VBS = 1.0 V p-p ±10 % Zo = 75 Ω ±5 % DC = 0 ±200 mV
7	EN VIDEO IN (G)	GND for EN VIDEO
8	RET & GEN OUT (G)	GND for RETURN & GENLOCK
9	RET & GEN OUT (X)	VS = 1.0 V p-p Zi = 75 Ω ±5 % DC = 0 ±200 mV
10	S DATA IN/OUT	0 to 5 V Zi ≧ 10 kΩ
11	R/C VIDEO IN (X)	V = 714/286 mV p-p (BURST) ±2 % (75 % COLOR BARS) Zo = 75 Ω ±5 % DC = 0 ±200 mV
12	G/Y VIDEO IN (X)	VS = 1.0 V p-p ±2 % Zo = 75 Ω ±5 % DC = 0 ±200 mV
13	TALLY OUT	Zi ≧ 600 Ω
14	B VIDEO IN (X)	V = 714 mV p-p ±2 % (75 % COLOR BARS) Zo = 75 Ω ±5 % DC = 0 ±200 mV

REMOTE (10P FEMALE)



(External view)

No.	Signal	Specifications
1	PAN	0 to 5 V
2	MONITOR OUT (X)	VBS = 1.0 V p-p ±10 % Zo = 75 Ω ±5 % DC = 0 ±200 mV
3	MONITOR OUT (G)	GND for MONITOR
4	TILT	0 to 5 V
5	ZOOM	0 to 5 V
6	S DATA IN/OUT	Zi ≧ 10 kΩ  4.5 ±0.5 Vdc 0 ±0.5 Vdc
7	ON/OFF	ON : +5 V OFF : 0 V
8	FOCUS	0 to 5 V
9	GND	
10	+9 V	



TALLY/INTERCOM (4P FEMALE)

(External view)

No.	Signal	Specifications
1	TALLY IN	Zi ≧ 600 Ω
2	INCOM IN/OUT(X)	Zo = 600 Ω
3	INCOM IN/OUT(Y)	
4	INCOM IN/OUT(G)	GND for INCOM

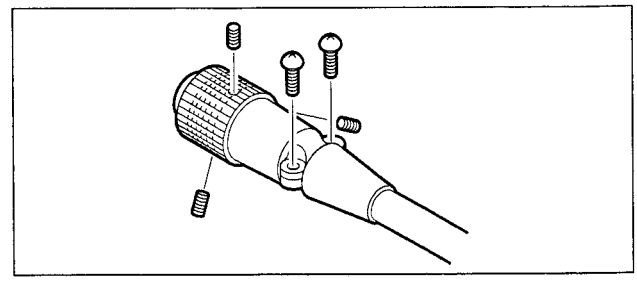
2-1-2. Connection Conector

Connection made with the connector panels during installation or service, should be made with the connectors/ complete cable assemblies specified in the following list, or equivalent parts.

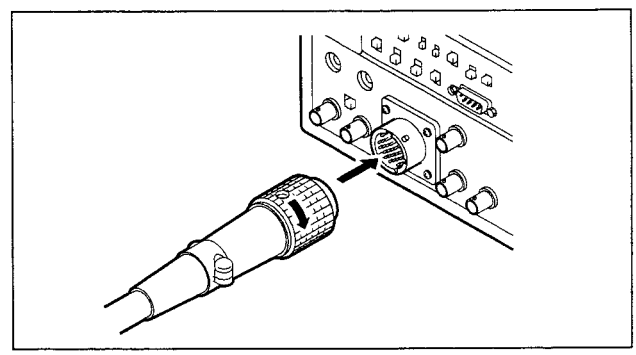
Connector Name	Connection Connector/Cable
PROMPT VIDEO GENLOCK VBS OUT R/R-Y, G/Y, B/B-Y SYNC OUT MONITOR OUT RETURN VIDEO	1-569-370-12 PLUG, BNC or BELDEN8281 cable equivalent
MIC OUT (3P FEMALE)	1-516-125-00 XLR, 3P Male or CANNON XLR-3-12C equivalent
CAMERA (26P FEMALE)	1-564-183-21 CONNECTOR, 26P Male or CCZ cable assembly (for 26P camera) CCZ-A2 (2 m) to CZ-A100 (100 m) CCTZ cable assembly (for 20P camera) CCTZ-3RGB (3 m) CCTZ-3YC (3 m)
CAMERA (14P FEMALE)	1-508-929-00 CONNECTOR, 14P Male or CCQ cable assembly (for 14P camera) CCQ-10AM (10 m) to CQ-100AM (100 m) CCTQ cable assembly (for 20P camera) CCTQ-3RGB (3 m)
REMOTE (10P FEMALE)	1-506-522-11 PLUG, CONNECTOR ROUND 10P, Male or HIROSE HR10A-10P-10P equivalent
TALLY/INTERCOM (4P FEMALE)	1-508-723-00 4P, PLUG, DIN or CCDD-2.5 (2.5 m) cable

2-1-3. Removal of CCZ/CCTZ/CCQ/CCTQ Connector

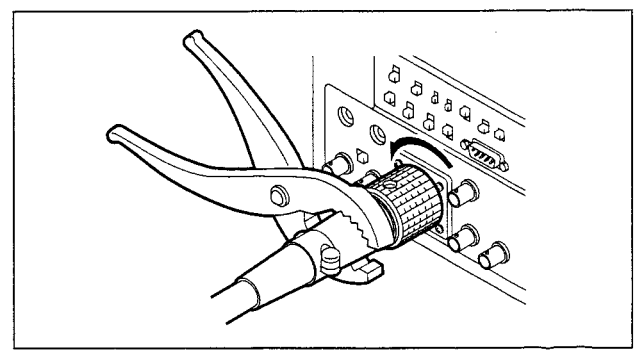
1. Remove the two screws and three setscrews.



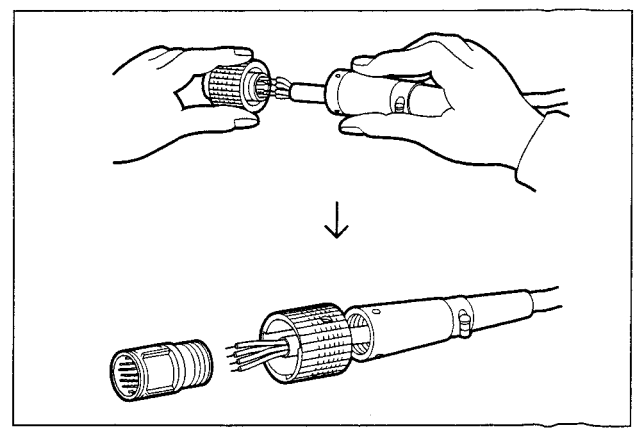
2. Connect the plug to the VTR or camera.



3. Loosen the plug counterclockwise by pliers.

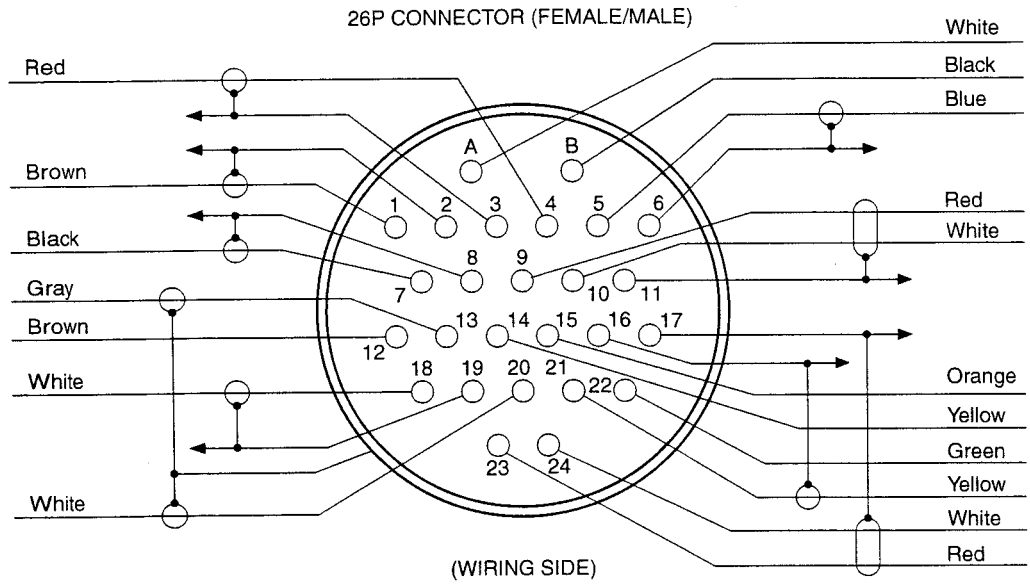


4. Disassemble as illustrated and unsolder.

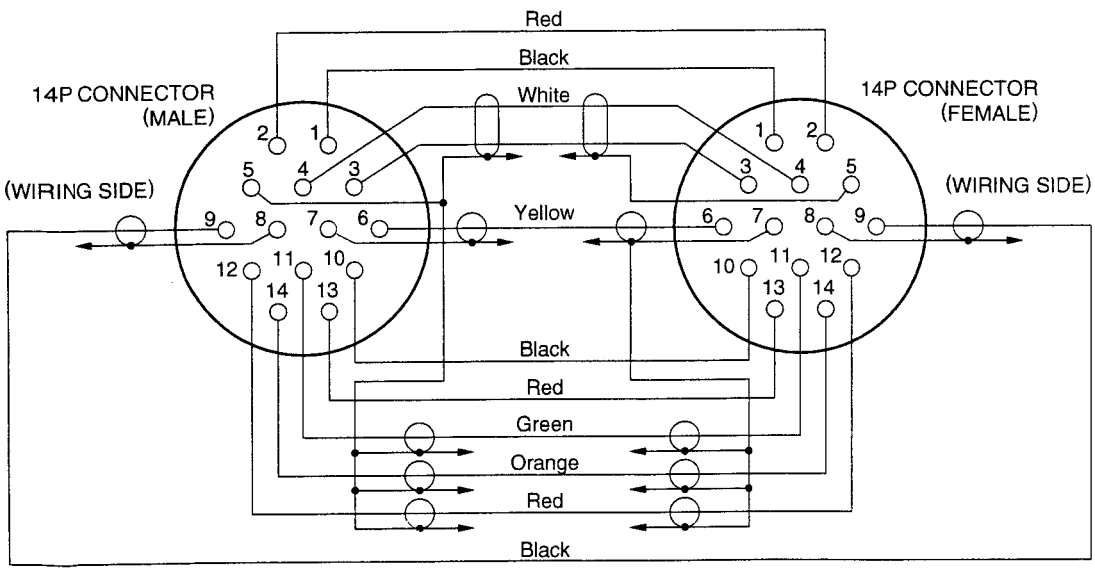


2-1-4. Wring Diagrams for Cables

CCZ-An Cable



CCQ-n AM Cable



2-2. To Change the Camera Connector 26-pin to 14-pin

When connecting CCQ cable (14-pin) to this unit, change the Z type 26-pin camera connector (CN-1970 board) to the Q type 14-pin camera connector (CN-1971 board) in the following procedure.
The CN-1971 board is registered as a service part.

Parts required

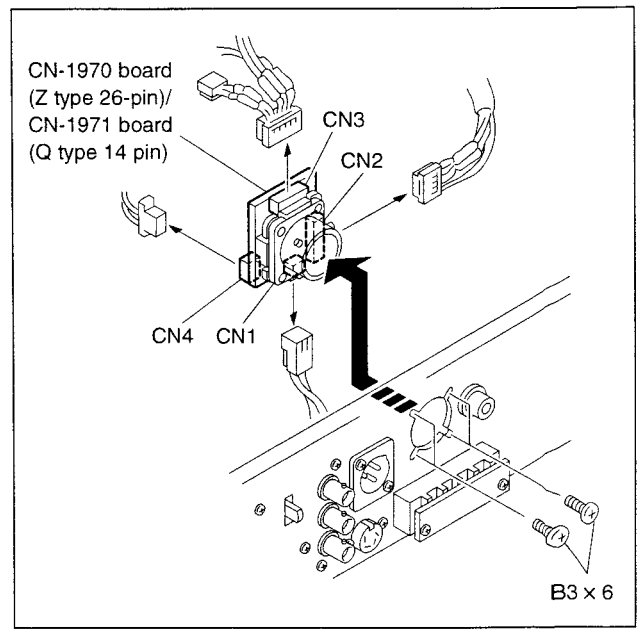
CN-1971 board: 1 (Sony part No. A-8325-667-A)

Note

When a camera connector in change to the Q type 14-pin, the prompter signal input into this unit cannot be transmit to the camera connected to this unit.
The audio signal from a camera cannot be input to this unit, either.
The adjustment after camera connector change is unnecessary.

Change procedure

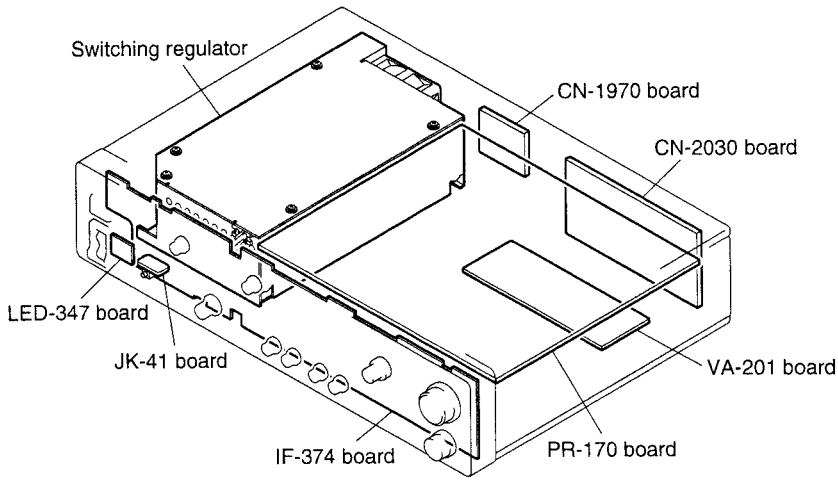
1. Remove the top cover. (Refer to Section 3-2.)
2. Remove the PR-170 board. (Refer to Section 3-6.)
3. Remove the four screws, then pull out the CN-1970 board (Z type 26-pin) in the direction indicated by the arrow.
4. Disconnect the harness connectors from CN1, CN2, CN3 and CN4 on the CN-1970 board (Z type 26-pin).



5. Install a new CN-1971 board (Q type 14-pin) in the reverse order of steps 1 to 4.

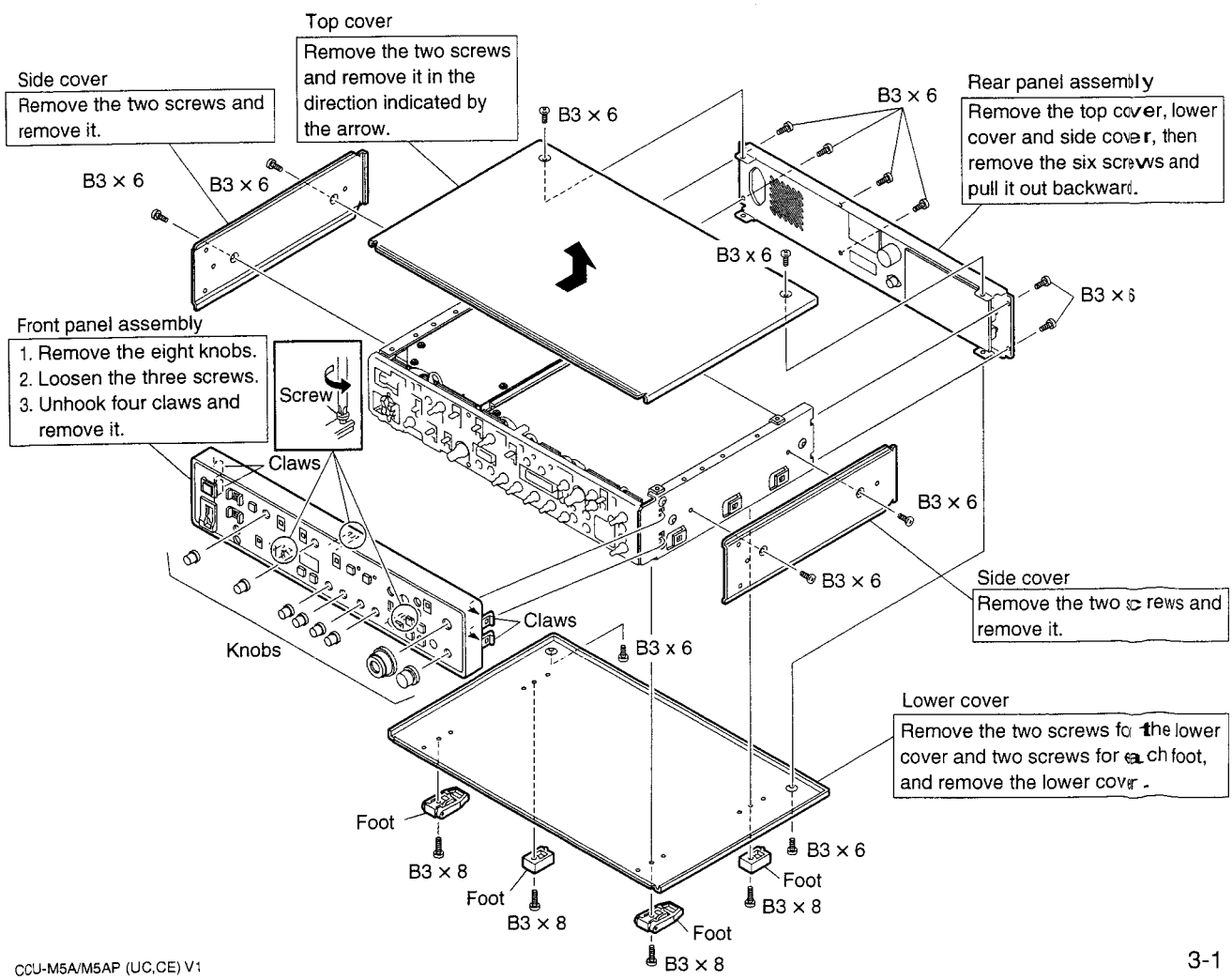
Section 3
Service Overview

3-1. Board Layout



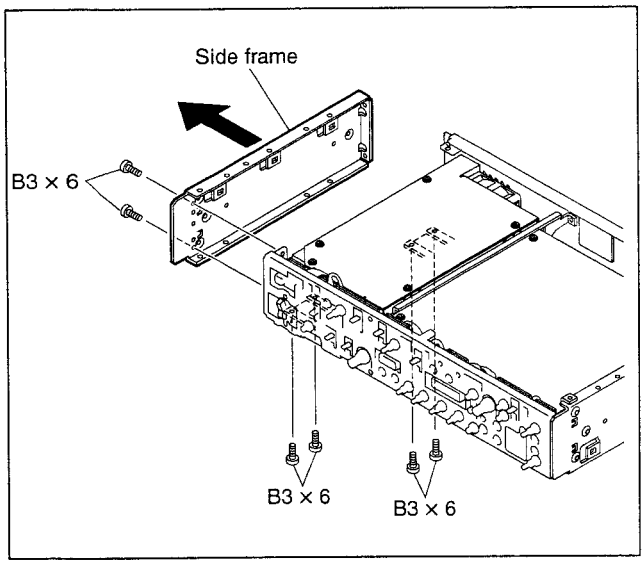
3-2. Removal/Installation of Cabinet

When reinstalling, perform the reverse order of removal.

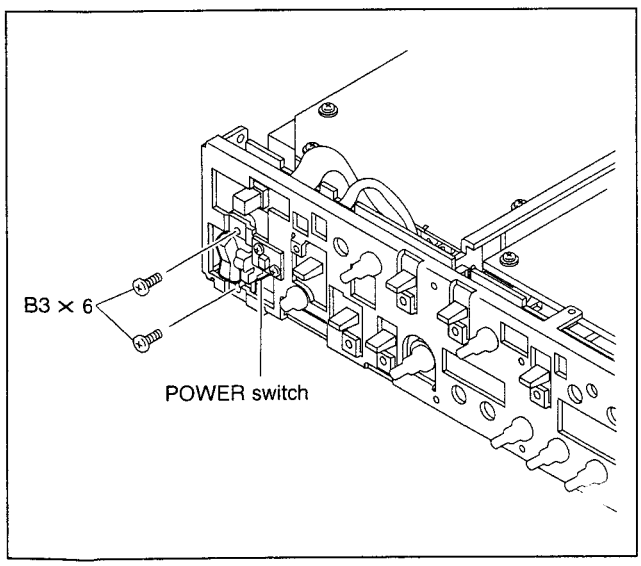

Top cover
Remove the two screws and remove it in the direction indicated by the arrow.
Side cover
Remove the two screws and remove it.
B3 × 6
Rear panel assembly
Remove the top cover, lower cover and side cover, then remove the six screws and pull it out backward.
Front panel assembly
1. Remove the eight knobs.
2. Loosen the three screws.
3. Unhook four claws and remove it.
Screw
Claws
Knobs
Side cover
Remove the two screws and remove it.
Lower cover
Remove the two screws for the lower cover and two screws for each foot, and remove the lower cover.
Foot
B3 × 8

3-3. Replacement of Switching Regulator

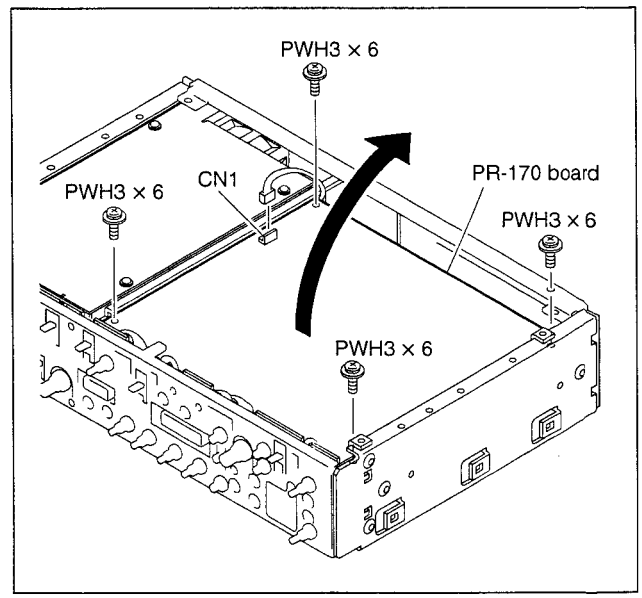
1. Remove the top cover, lower cover, side cover, front panel assembly, and rear panel assembly. (Refer to Section 3-2.)
2. Remove the six screws and the side frame.



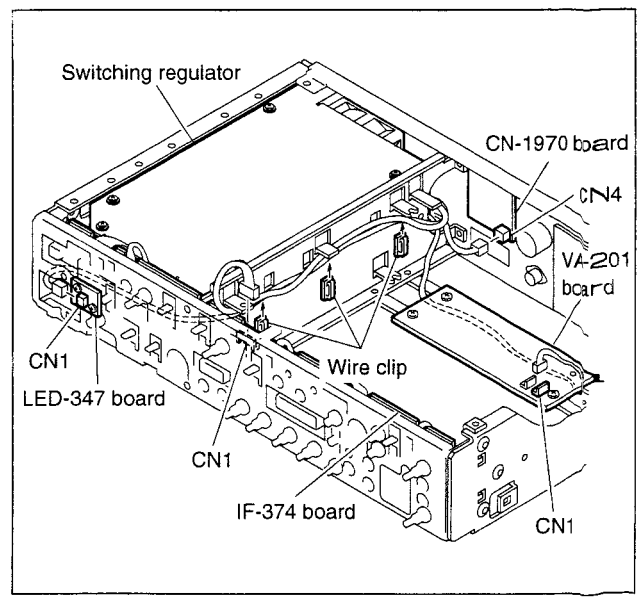
3. Remove the two screws, then remove the POWER switch from the front frame assembly.



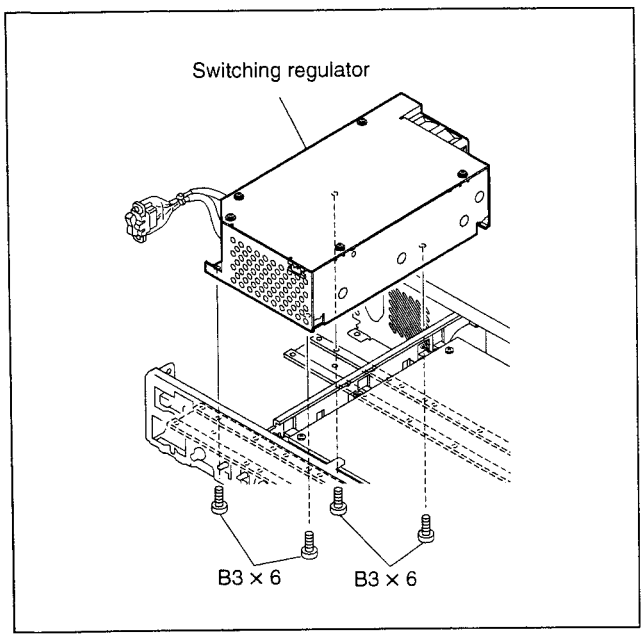
4. Disconnect the harness connector from CN1 on the PR-170 board.
5. Remove the four screws and raise the PR-170 board in the direction indicated by the arrow.



6. Disconnect the harness connectors from the following connectors:
   - CN1/LED-347 board
   - CN1/IF-347 board
   - CN1/VA-201 board
   - CN4/CN-1970 board
7. Remove the harness from the wire clip.



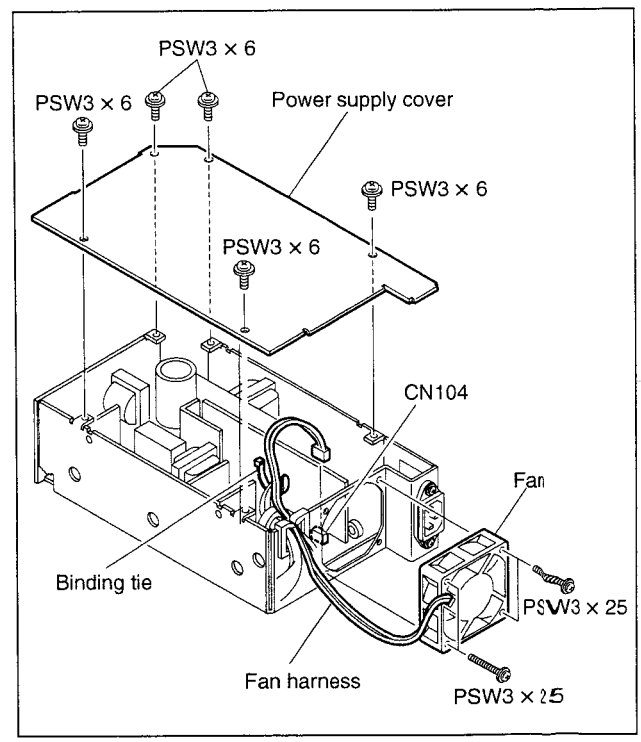
8. Remove the four screws, then remove the switching regulator.



9. Install a new switching regulator in the reverse order of steps 1 to 8.

3-4. Replacement of Fan

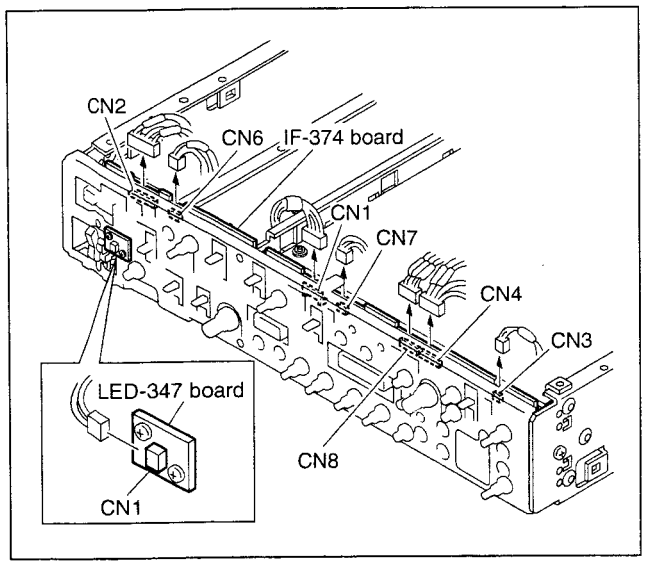
1. Remove the top cover, lower cover, side cover, front panel assembly and rear panel assembly. (Refer to Section 3-2.)
2. Remove the switching regulator. (Refer to Section 3-3.)
3. Remove the five screws and remove the power supply cover.
4. Cut the binding tie, then disconnect the harness connector from CN104 on the power board.
5. Remove the four screws, then remove the fan.



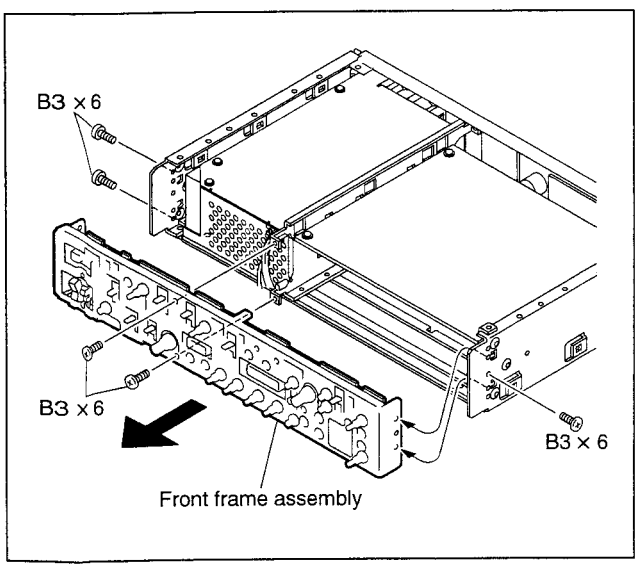
6. Install a new fan in the reverse order of steps 1 to 5.

3-5. Replacement of IF-374 board

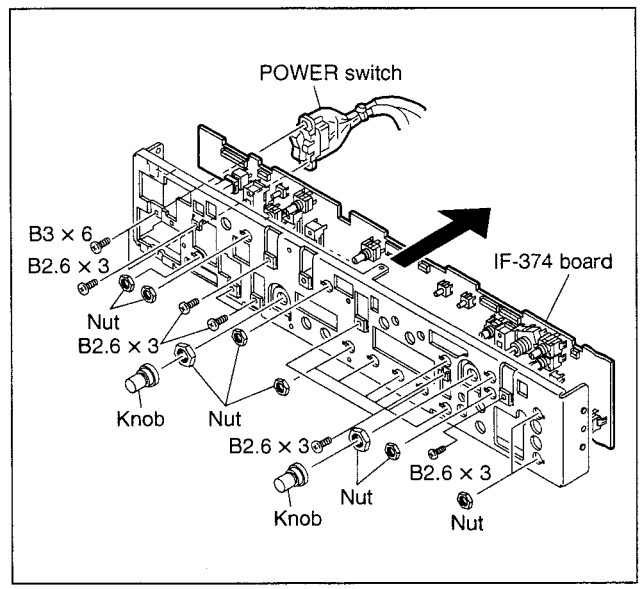
1. Remove the top cover, side cover and front panel assembly. (Refer to Section 3-2.)
2. Disconnect the harness connectors from CN1, CN2, CN3, CN4, CN6, CN7 and CN8 on the IF-374 board.
3. Disconnect the harness connector from CN1 on the LED-347 board.



4. Remove the five screws, then pull out the front frame assembly.



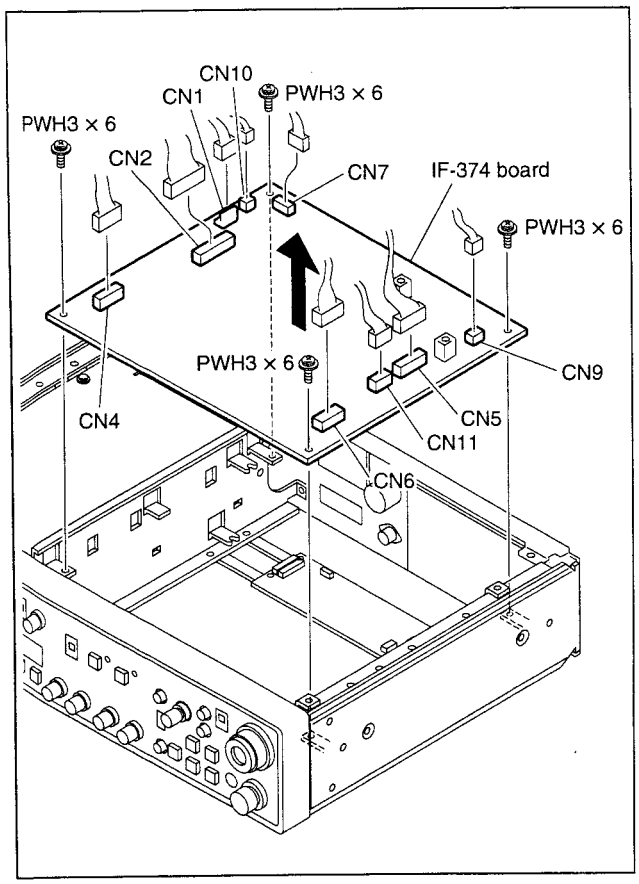
5. Remove the two screws, then remove the POWER switch from the front frame assembly.
6. Remove the two knobs and fifteen nuts from the front frame assembly.
7. Remove the eight screws, then remove the IF-374 board from the front frame assembly.



8. Install a new IF-374 board in the reverse order of steps 1 to 7.

3-6. Replacement of PR-170 board

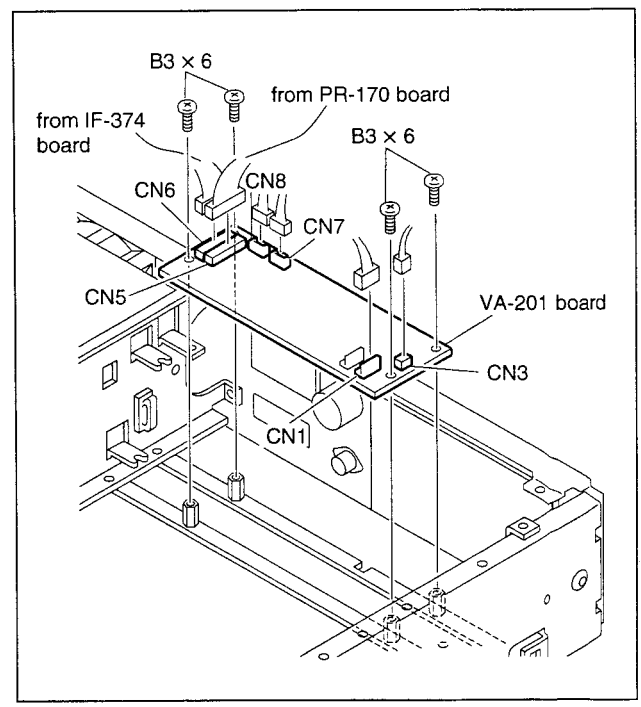
1. Remove the top cover. (Refer to Section 3-2.)
2. Disconnect the harness connectors from CN1, CN2, CN4, CN5, CN6, CN7, CN9, CN10 and CN11 on the PR-170 board.
3. Remove the four screws, then remove the PR-170 board.



4. Install a new PR-170 board in the reverse order of steps 1 to 3.

3-7. Replacement of VA-201 board

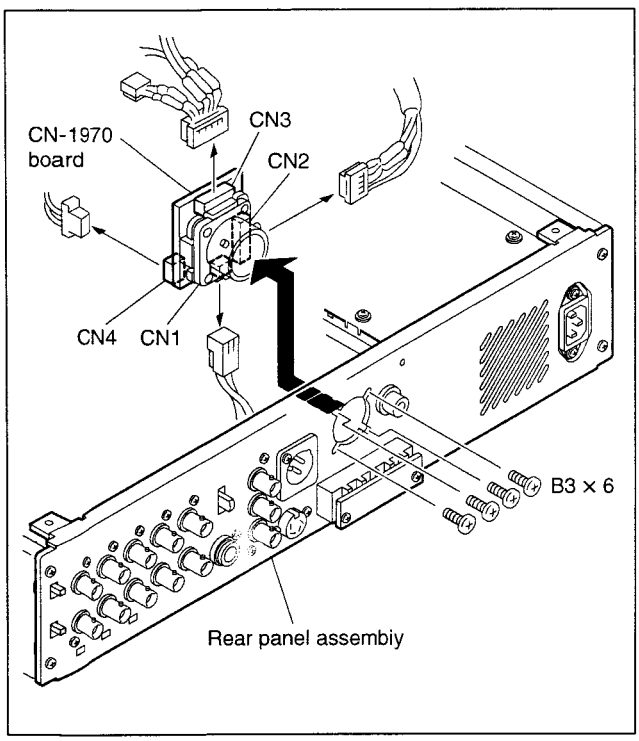
1. Remove the top cover. (Refer to Section 3-2.)
2. Remove the PR-170 board. (Refer to Section 3-6.)
3. Disconnect the harness connectors from CN1, CN3, CN5, CN6, CN7 and CN8 on the VA-201 board.
4. Remove the four screws, then remove the VA-201 board.



5. Install a new VA-201 board in the reverse order of steps 1 to 4.

3-8. Replacement of CN-1970

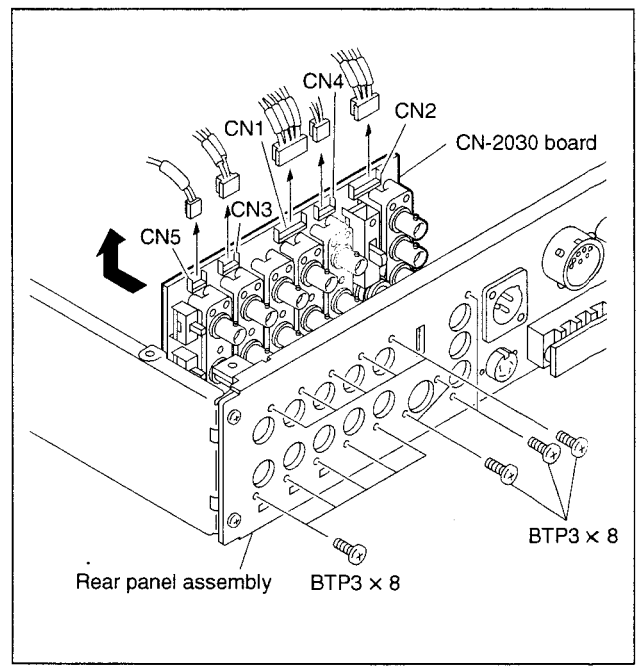
1. Remove the top cover. (Refer to Section 3-2.)
2. Remove the PR-170 board. (Refer to Section 3-6.)
3. Remove the four screws, then pull out the CN-1970 board in the direction indicated by the arrow.
4. Disconnect the harness connectors from CN1, CN2, CN3 and CN4 on the CN-1970 board.



5. Install a new CN-1970 board in the reverse order of steps 1 to 4.

3-9. Replacement of CN-2030 board

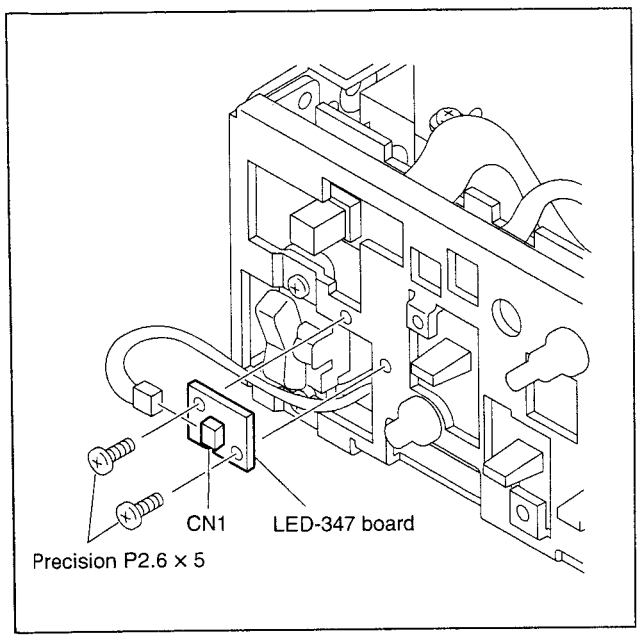
1. Remove the top cover. (Refer to Section 3-2.)
2. Remove the PR-170 board. (Refer to Section 3-6.)
3. Remove the fourteen screws, then pull out the CN-2030 board in the direction indicated by the arrow.
4. Disconnect the harness connectors from CN1, CN2, CN3, CN4 and CN5 on the CN-2030 board.



5. Install a new CN-2030 board in the reverse order of steps 1 to 4.

3-10. Replacement of LED-347

1. Remove the top cover, side cover, and front panel assembly. (Refer to Section 3-2.)
2. Disconnect the harness connector from CN1 on the LED-347 board.
3. Remove the two screws, then remove the LED-347 board.



4. Install a new LED-347 board in the reverse order of steps 1 to 3.

Section 4
Alignment

4-1. Preparation

4-1-1. Equipments Required

- Digital voltmeter
- Oscilloscope (band: 30 MHz or more)
- Audio frequency signal generator (1 kHz, sine wave)
- Test signal generator (Signal: SWEEP signal with sync)
- CCZ Cables: 25 m (CCZ-A25 cable) × 1
  50 m (CCZ-A50 cable) × 1
  100 m (CCZ-A100 cable) × 3
- Cable extension connector (CCZZ-1E) × 2
- Vectorscope (Tektronix1765 equivalent)
- Waveform monitor
- Color video camera DXC-537/537P (completely adjusted)
- Camera adaptor CA-537/537P (completely adjusted)
- Color monitor (Sony PVM-1320 equivalent)

4-1-2. On CCZ Cable Length

The following CCZ cables are required for CCU-M5A/M5AP adjustment.

Cable length: 25 m, 50 m, 100 m, 200 m, 300 m

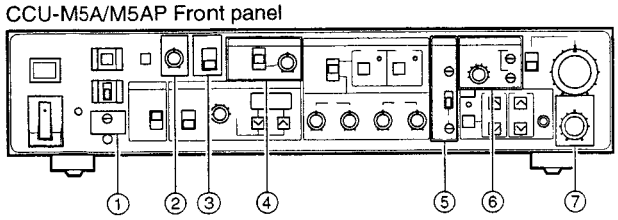
Among above cables, 200 m and 300 m cables are required to extend by using the cable extension connector CCZZ-1E.

4-1-3. List of Adjustment Controls

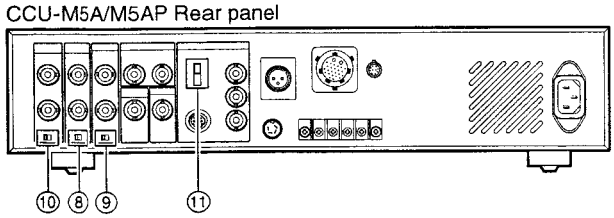
Board	Potentiometer	Adjustment	Item
PR-170	RV101	VBS GAIN	4-2-1
	RV102	VBS FREQ 1	4-2-2
	RV103	VBS FREQ 2	4-2-3
	RV104	VBS FREQ 3	4-2-4
	RV201	R GAIN	4-3-1
	RV202	R FREQ 1	4-3-2
	RV203	R FREQ 2	4-3-3
	RV204	R FREQ 3	4-3-4
	RV301	G GAIN	4-3-1
	RV302	G FREQ 1	4-3-2
	RV303	G FREQ 2	4-3-3
	RV304	G FREQ 3	4-3-4
	RV401	B GAIN	4-3-1
	RV402	B FREQ 1	4-3-2
	RV403	B FREQ 2	4-3-3
	RV404	B FREQ 3	4-3-4
	RV501	SYNC CLIP LEVEL	4-4-1
	RV502	GAMMA	4-4-11
	RV503	BIAS-1	4-4-10
	RV504	BIAS-2	4-4-10
	RV505	BURST OFFSET	4-4-2
	RV506	CHROMA LEVEL	4-4-12
	RV507	CLAMP PULSE PHASE	4-4-8
	RV508	CLAMP PULSE WIDTH	4-4-9
	RV509	BURST GATE PULSE PHASE	4-4-3
	RV510	BURST GATE PULSE WIDTH	4-4-4
	RV511	ADVANCED SYNC PHASE	4-4-5
	RV512	SYNC WIDTH	4-4-6
	RV515	GAMMA SET	4-4-10 4-4-11
	RV516	1/2H ADJ	4-4-7
	RV517	BURST LEVEL	4-4-12
	LV501	HUE	4-4-13
	LV502	SC 180° ADJ	4-4-13
VA-201	RV1	PROMPT GAIN	4-5-1
	RV2	PROMPT FREQ1	4-5-4
	RV3	PROMPT FREQ2	4-5-3
	RV4	PROMPT FREQ3	4-5-2
IF-374	RV12	INTERCOM	4-6-1

4-1-4. Initial Setting of Switches

CCU-M5A/M5AP Front panel



CCU-M5A/M5AP Rear panel



① INTERCOM CONTROL ..... Mechanical center
② DETAIL CONTROL ..... Mechanical center
③ GAIN SW ..... 0 dB
④ KNEE SW ..... PRESET
CONTROL ..... Mechanical center
⑤ PHASE SW ..... 0°
CONTROL ..... Mechanical center
⑥ CABLE COMP CONTROL 25
FINE-Y/C SW ..... Mechanical center
⑦ MASTER PEDESTAL CONTROL .. Mechanical center

⑧ RETURN VIDEO 75 Ω TERMINATION SW .. ON
⑨ GENLOCK 75 Ω TERMINATION SW ..... ON
⑩ PROMPT VIDEO 75 Ω TERMINATION SW ... ON
⑪ OUTPUT SW ..... RGB

4-1-5. Making Tools

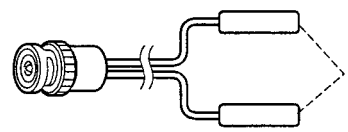
For CCU-M5A/M5AP adjustment, prepare a tool for the signal to be input to the camera connector.
Refer to the following figure.

1. Preparation

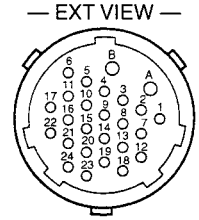
- BNC connectors × 2 (Sony Part No. 1-508-898-00)
- Lead wires × 4 (Use lead wires of different color to distinguish the signal line from the GND line.)
- Pins (Male) × 4 (pins which can be inserted into CCZ female connector.

2. Making tools

Make two tools as shown in the figure.

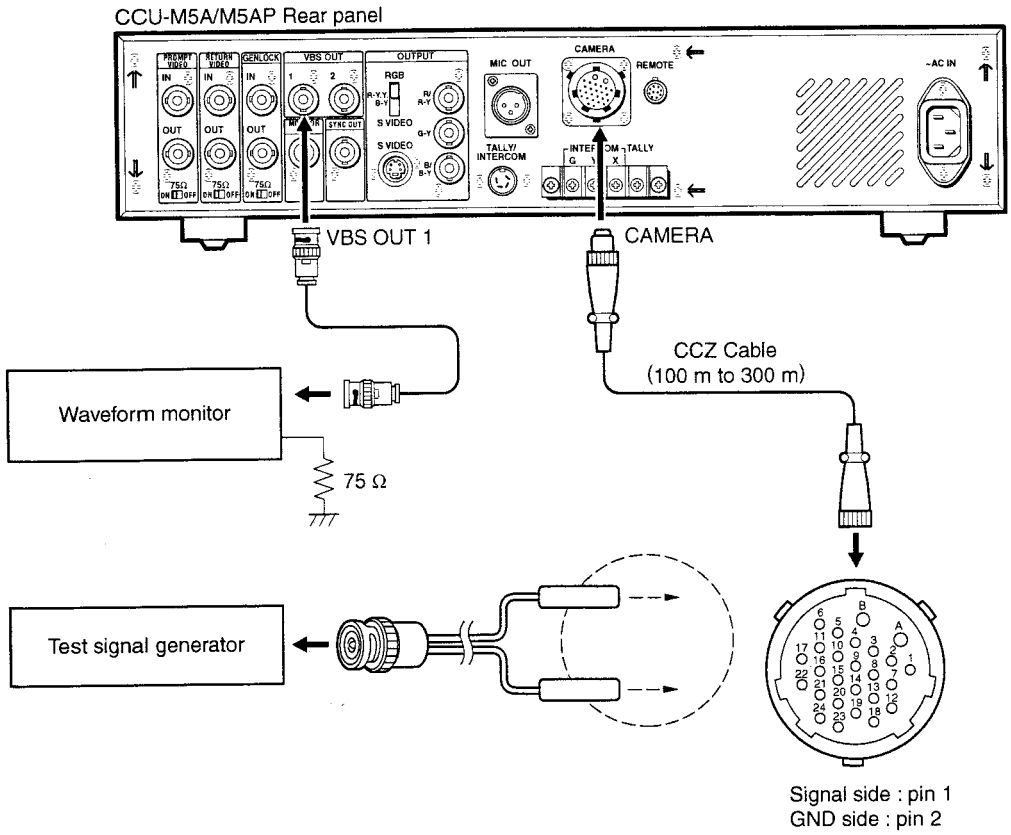


CCZ connector (Female)
— EXT VIEW —



4-2. VBS Video Amplifier System Adjustment

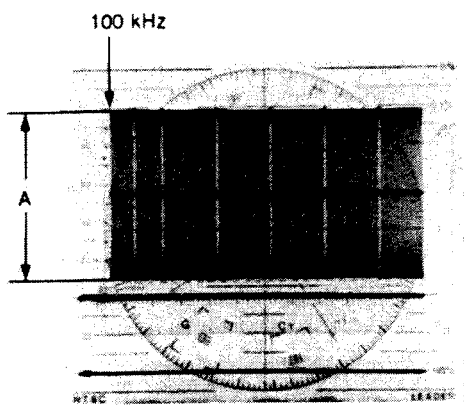
Connection diagram:



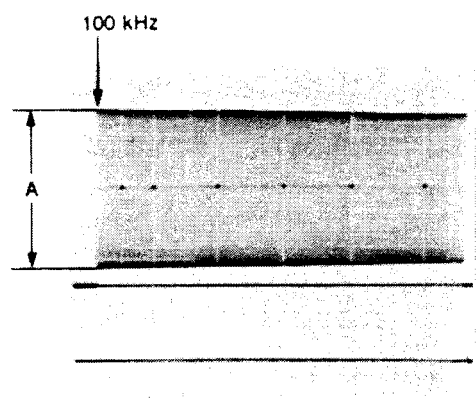
Video signal:

Output signal/test signal generator: WEEP signal with sync

[for NTSC]



[for PAL]

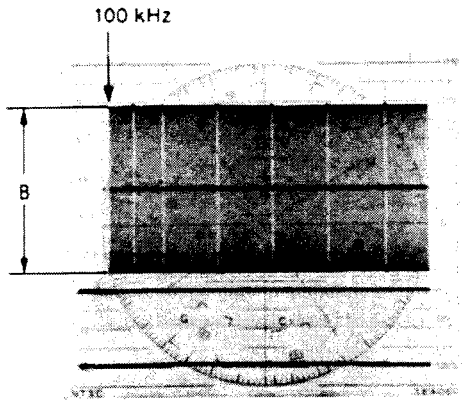


* Measure the level "A" of 100 kHz and record it.

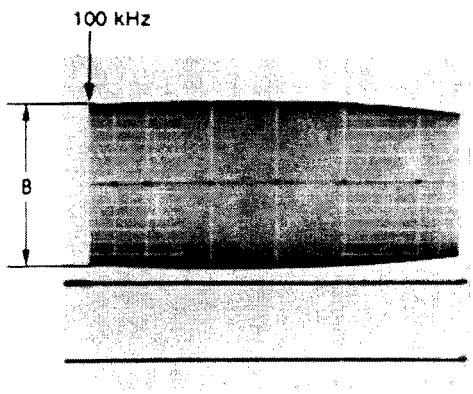
4-2-1. VBS Video Level Adjustment

Equipment: Waveform Monitor (WFM)
CCZ cable length: 100 m
Preparation: CABLE COMP selector/
Front panel → [100 m]
CABLE COMP FINE Y/C control/
Front panel → Mechanical center
Test point: VBS OUT1 connector/Rear panel
Adjustment point: ◐RV101/PR-170 (N)/(P) board
Specification: B = A ±2 %
(A...100 kHz level of output signal)

[for NTSC]



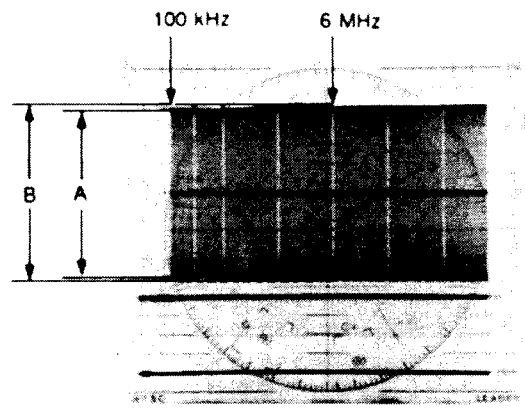
[for PAL]



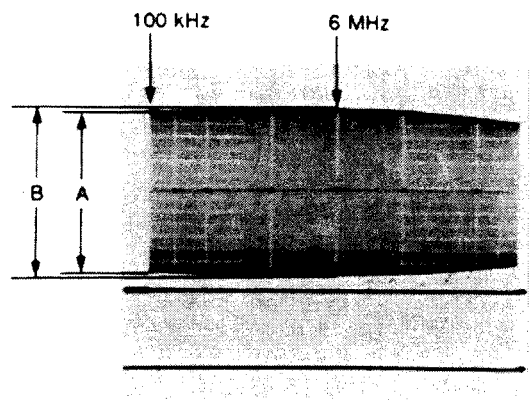
4-2-2. VBS Video Cable Compensation Adjustment 1

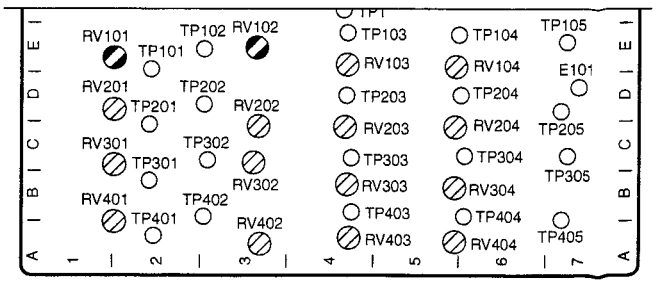
Equipment: Waveform Monitor (WFM)
CCZ cable length: 100 m
Preparation: CABLE COMP selector/
Front panel → [100 m]
CABLE COMP FINE Y/C control/
Front panel → Mechanical center
Test point: VBS OUT1 connector/Rear panel
Adjustment point: ◐RV102/PR-170 (N)/(P) board
Specification: B = A ±2 %
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)

[for NTSC]



[for PAL]





PR-170 board (Component Side)

4-2-3. VBS Video Cable Compensation Adjustment 2

Equipment: Waveform Monitor (WFM)
CCZ cable length: 200 m

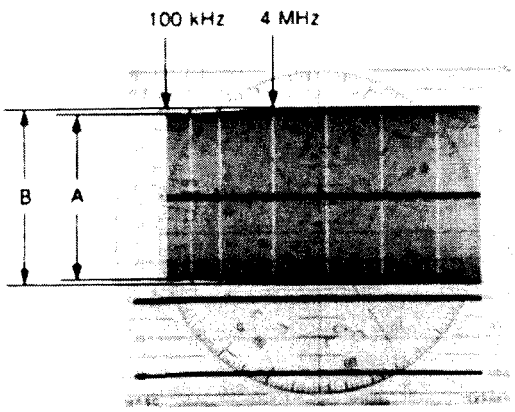
Preparation: CABLE COMP selector/
Front panel → [200 m]
CABLE COMP FINE Y/C control/
Front panel → Mechanical center

Test point: VBS OUT1 connector/Rear panel

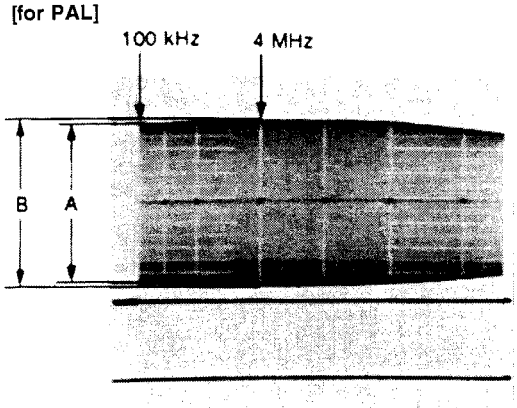
Adjustment point: ◓RV103/PR-170 (N)/(P) board

Specification: B = A ±2 %
(A...100 kHz level of output signal)
(B...4 MHz level of output signal)

[for NTSC]



[for PAL]



4-2-4. VBS Video Cable Compensation Adjustment 3

Equipment: Waveform Monitor (WFM)
CCZ cable length: 300 m

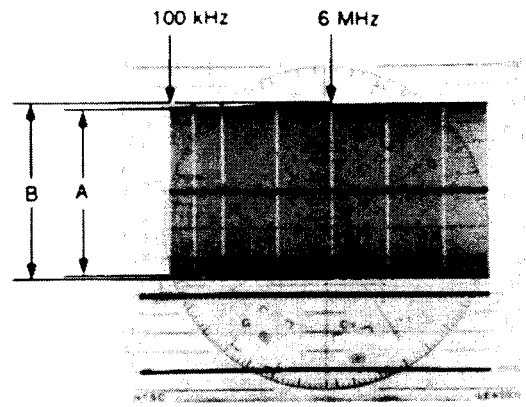
Preparation: CABLE COMP selector/
Front panel → [300 m]
CABLE COMP FINE Y/C control/
Front panel → Mechanical center

Test point: VBS OUT1 connector/Rear panel

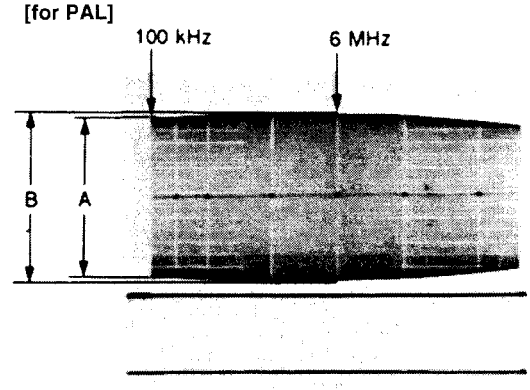
Adjustment point: ◓RV104/PR-170 (N)/(P) board

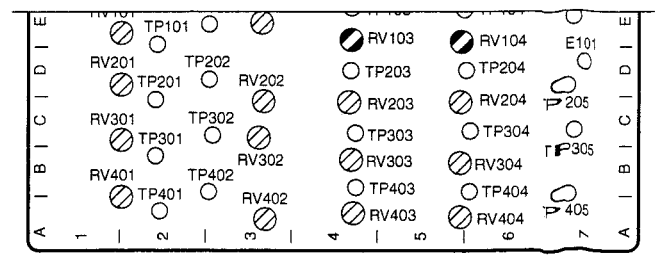
Specification: B = A ±2 %
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)

[for NTSC]



[for PAL]

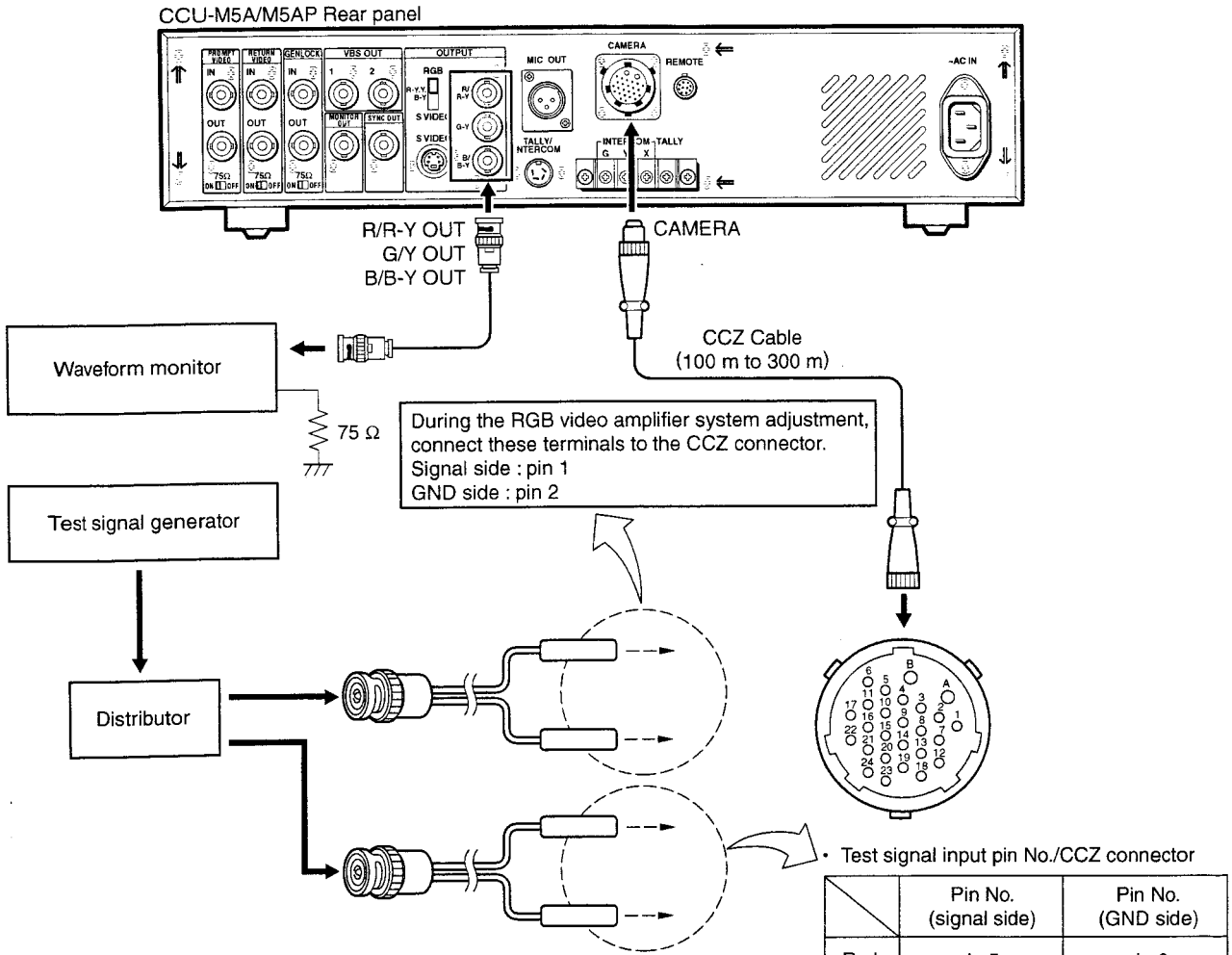




PR-170 board (Component Side)

4-3. RGB Video Amplifier Adjustment

Connection diagram:



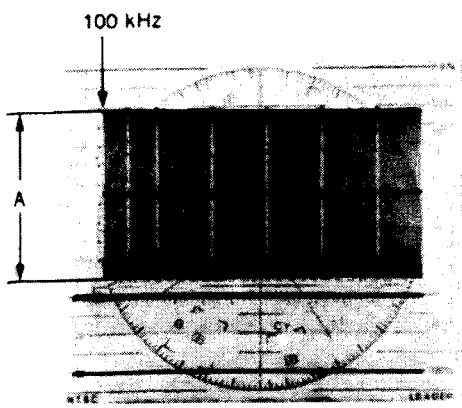
• Test signal input pin No./CCZ connector

	Pin No. (signal side)	Pin No. (GND side)
R-ch	pin 5	pin 6
G-ch	pin 4	pin 3
B-ch	pin 7	pin 8

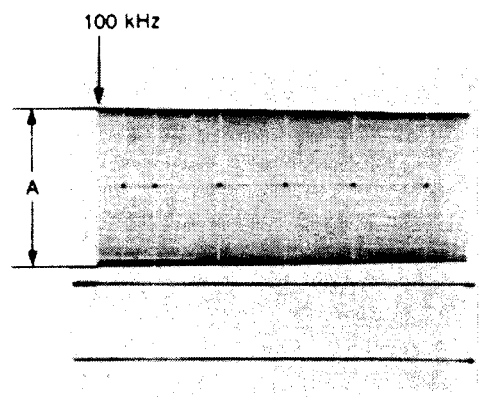
Video signal:

Output signal of distributor: SWEEP signal with sync

[for NTSC]



[for PAL]



* Measure the levle "A" of 100 kHz and record it.

4-3-1. RGB Video Level Adjustment

Equipment: Waveform monitor (WFM)
CCZ cable length: 100 m

Preparation:

1. Test signal input pin No./CCZ connector.
   (Refer to the connection diagram for pin nos.)
2. CABLE COMP selector/Front panel → [100 m]
3. OUTPUT switch/Rear panel → "RGB"

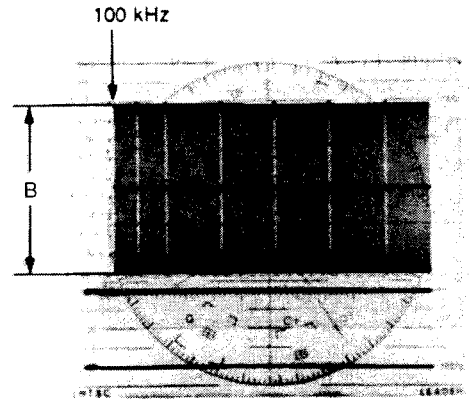
Adjustment procedure:

Adjust the Rch, Gch, and Bch levels to meet each following specification.

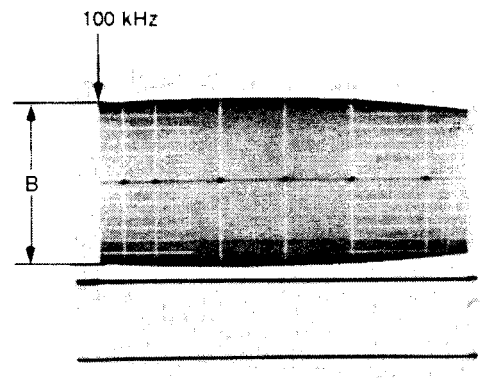
	Test point/ Rear panel	Adjustment point/ PR-170 (N)/(P) board	Specification
R-ch	R/R-Y OUT connector	⊘RV201	B = A ±2 %
G-ch	G/Y OUT connector	⊘RV301	B = A ±2 %
B-ch	B/B-Y OUT connector	⊘RV401	B = A ±2 %

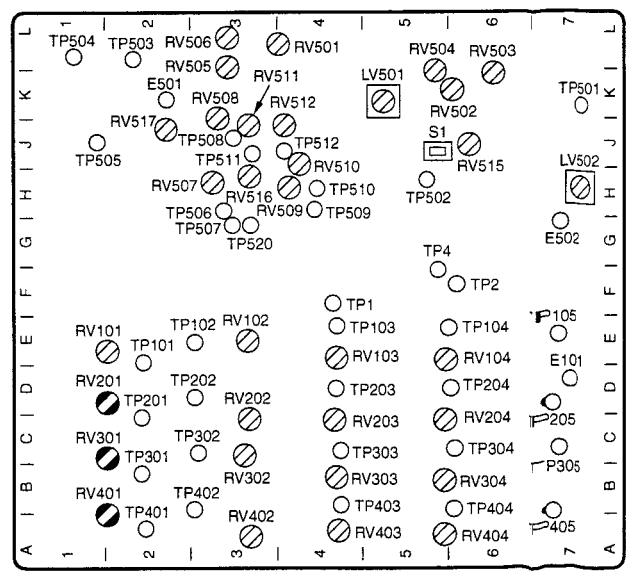
(B...100 kHz level of output signal)

[for NTSC]



[for PAL]





PR-170 board (Component Side)

4-3-2. RGB Video Cable Compensation Adjustment 1

Equipment: Waveform monitor (WFM)
CCZ cable length: 100 m

Preparation:

1. Test signal input pin No./CCZ connector.
   (Refer to the connection diagram for pin nos.)
2. CABLE COMP selector/Front panel → [100 m]
3. OUTPUT switch/Rear panel → "RGB"

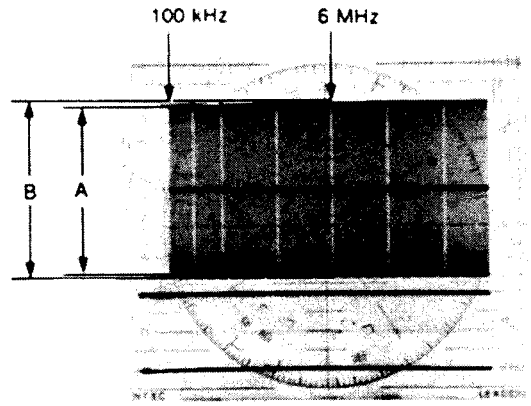
Adjustment procedure:

Adjust the Rch, Gch, and Bch levels to meet each following specification.

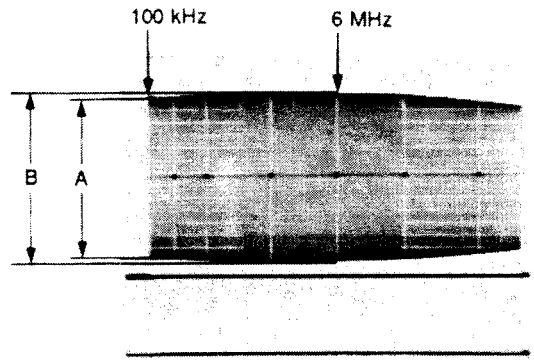
	Test point/ PR-170 (N)/(P) board	Adjustment point/ PR-170 (N)/(P) board	Specification
R-ch	R/R-Y OUT connector	◓RV202	B = A ±2 %
G-ch	G/Y OUT connector	◓RV302	B = A ±2 %
B-ch	B/B-Y OUT connector	◓RV402	B = A ±2 %

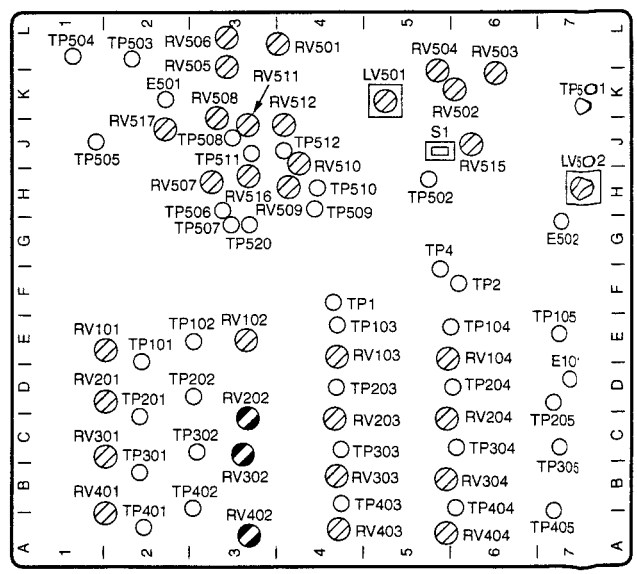
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)

[for NTSC]



[for PAL]





PR-170 board (Component Side)

4-3-3. RGB Video Cable Compensation Adjustment 2

Equipment: Waveform monitor (WFM)
CCZ cable length: 200 m

Preparation:

1. Test signal input pin No./CCZ connector.
   (Refer to the connection diagram for pin nos.)
2. CABLE COMP selector/Front panel → [200 m]
3. OUTPUT switch/Rear panel → "RGB"

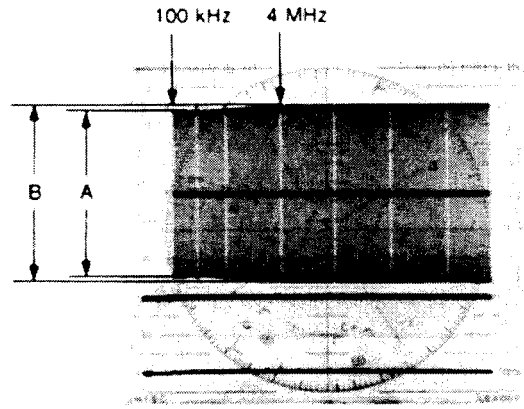
Adjustment procedure:

Adjust the Rch, Gch, and Bch levels to meet each following specification.

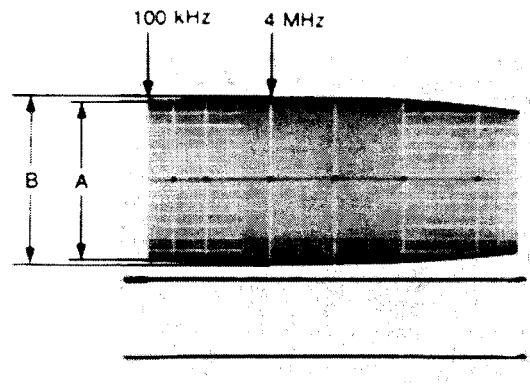
	Test point/ PR-170 (N)/(P) board	Adjustment point/ PR-170 (N)/(P) board	Specification
R-ch	R/R-Y OUT connector	⊘RV203	B = A ±2 %
G-ch	G/Y OUT connector	⊘RV303	B = A ±2 %
B-ch	B/B-Y OUT connector	⊘RV403	B = A ±2 %

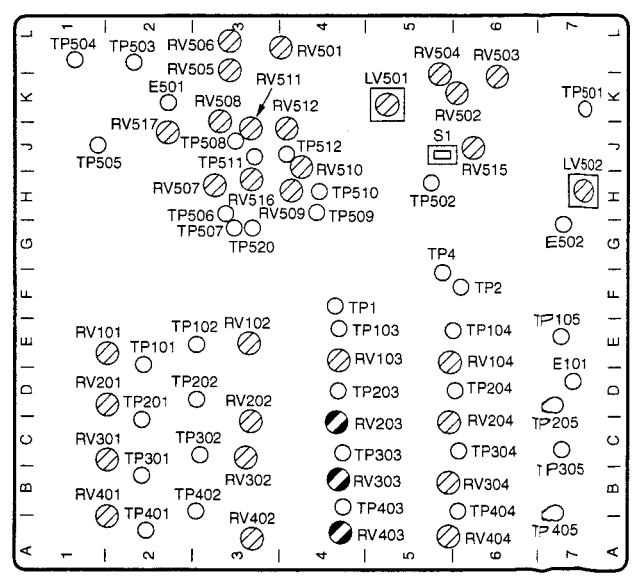
(A...100 kHz level of output signal)
(B...4 MHz level of output signal)

[for NTSC]



[for PAL]





PR-170 board (Component Side)

4-3-4. RGB Video Cable Compensation Adjustment 3

Equipment: Waveform monitor (WFM)
CCZ cable length: 300 m

Preparation:

1. Test signal input pin No./CCZ connector.
   (Refer to the connection diagram for pin nos.)
2. CABLE COMP selector/Front panel → [300 m]
3. OUTPUT switch/Rear panel → "RGB"

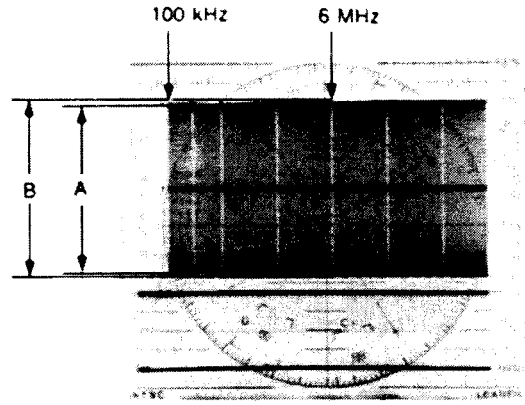
Adjustment procedure:

Adjust the Rch, Gch, and Bch levels to meet each following specification.

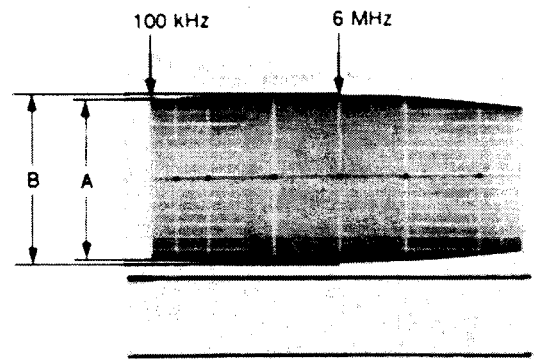
	Test point/ PR-170 (N)/(P) board	Adjustment point/ PR-170 (N)/(P) board	Specification
R-ch	R/R-Y OUT connector	⊘RV204	B = A ±2 %
G-ch	G/Y OUT connector	⊘RV304	B = A ±2 %
B-ch	B/B-Y OUT connector	⊘RV404	B = A ±2 %

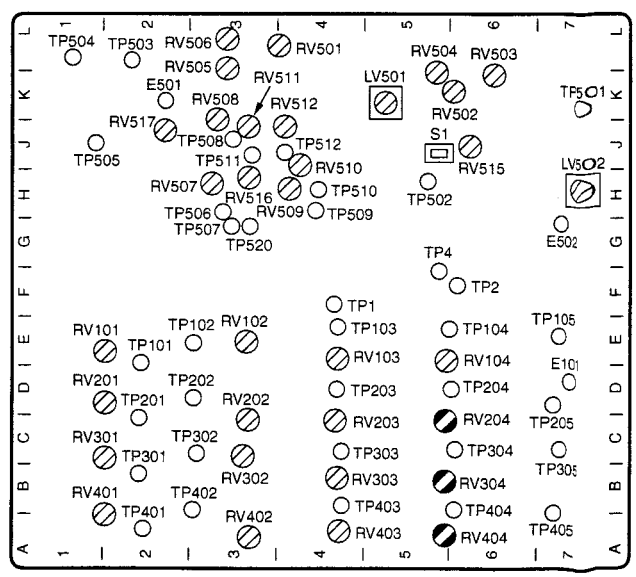
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)

[for NTSC]



[for PAL]



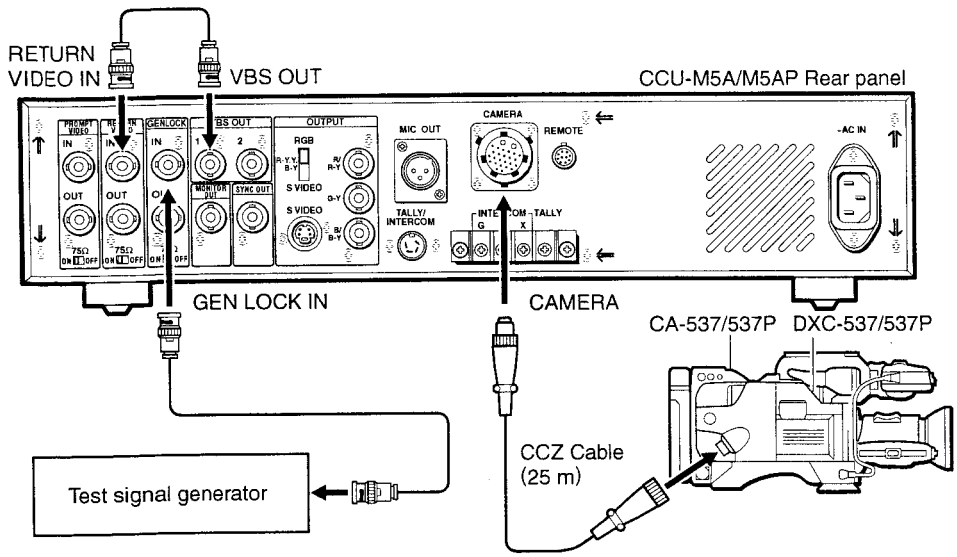


PR-170 board (Component Side)

4-4. RETURN VIDEO System (PR-170 (N)/(P) Board) Adjustment

Connection diagram:

(Perform the adjustment in the following connection as for sections 4-4-1 to 4-4-9.)

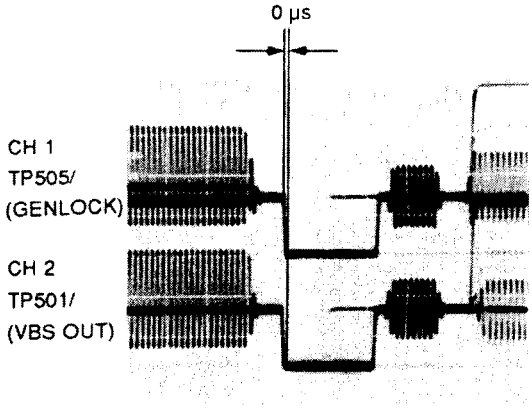


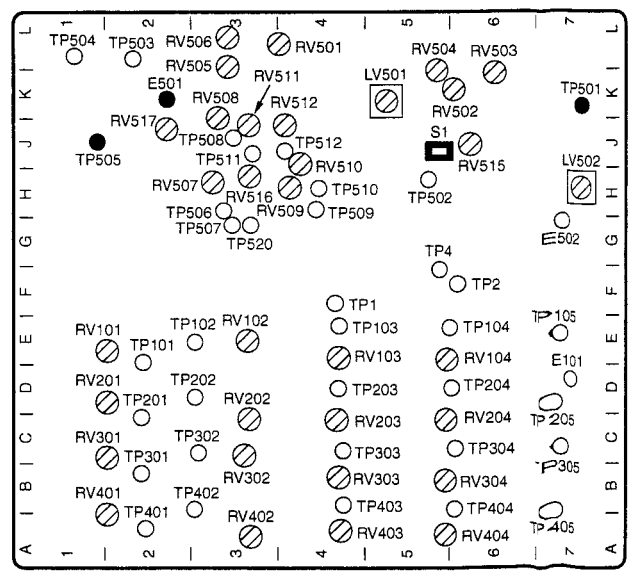
Preparation:

1. Input a color bar signal.
2. Set S1 (ADJ/OPE) switch on the PR-170 board to "ADJ" side.
3. Oscilloscope is connected as follows.
   CH1 : TP505 (GND : E501)/PR-170 (N)/(P) board
   CH2 : TP501 (GND : E501)/PR-170 (N)/(P) board
4. Set the "H PHASE" control (frot panel) of CCU to match the phase difference level of GEN LOCK and VBS OUT to 0 µs.

Note

During adjustment, be sure not to touch the H PHASE control.



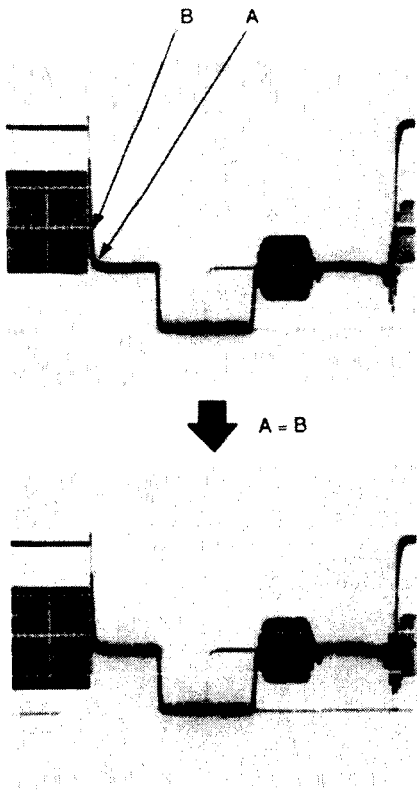


PR-170 board (Component Side)

4-4-1. SYNC CLIP Adjustment

Equipment: Oscilloscope
Test point: See Fig. 1.
Adjustment point: ⊘RV501/PR-170 (N)/(P) board

Adjustment procedure:
Match the level A to B with ⊘RV501.



4-4-2. Burst Offset Adjustment

Equipment: Oscilloscope
Test point: See Fig. 1.
Adjustment point: ⊘RV505/PR-170 (N)/(P) board

Adjustment procedure:
Match the level A to B with ⊘RV505.

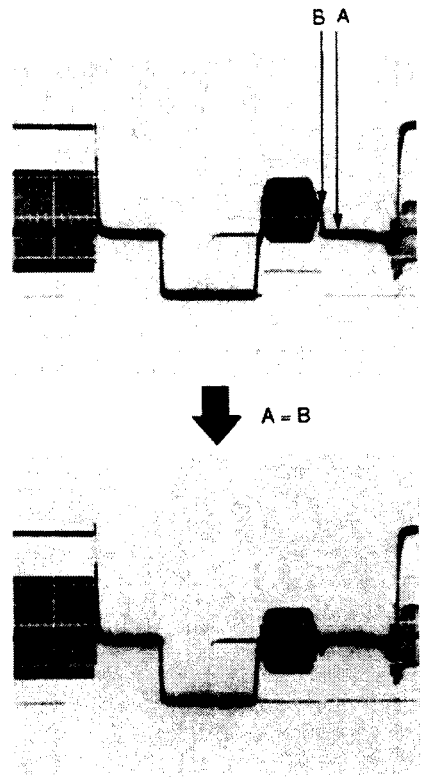
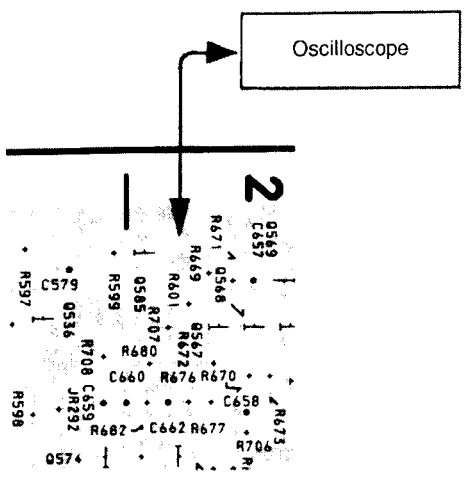
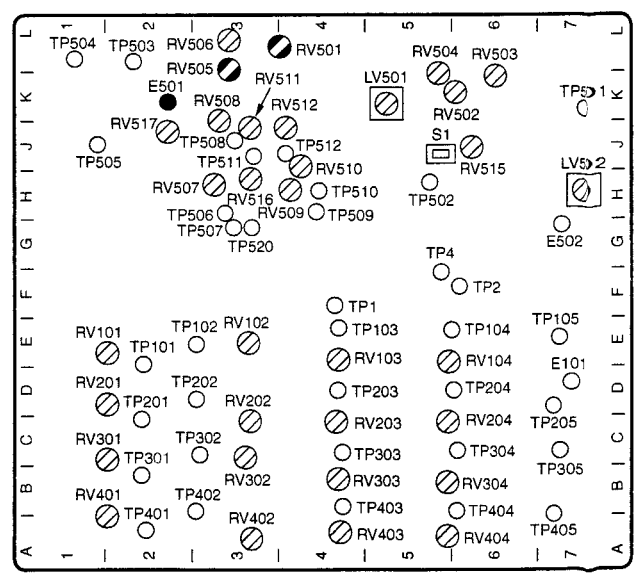


Fig.1 Measurement Point of 4-4-1 and 4-4-2
Measure the level after connecting the jumper wire (50 mm) at the point as shown in the figure.



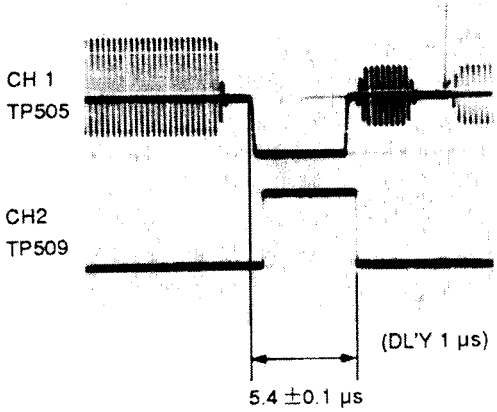
PR-170 board (Solder Side)



PR-170 board (Component Side)

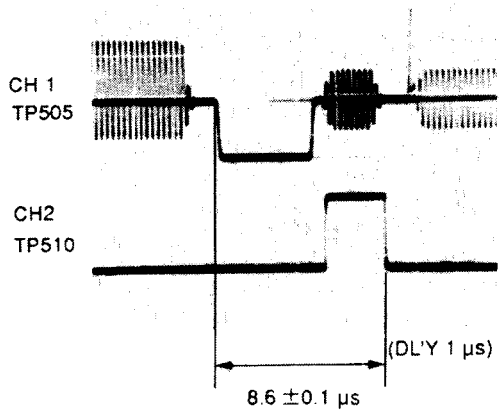
4-4-3. Burst Gate Pulse Phase Adjustment

Equipment: Oscilloscope
Test point: CH 1: TP505 (GND: E501)/
PR-170 (N)/(P) board
CH 2: TP509 (GND: E501)/
PR-170 (N)/(P) board
Trigger: HD (TP506/PR-170 (N)/(P) board)
Adjustment point: ⊘RV509/PR-170 (N)/(P) board
Specification: 5.4 ±0.1 µs



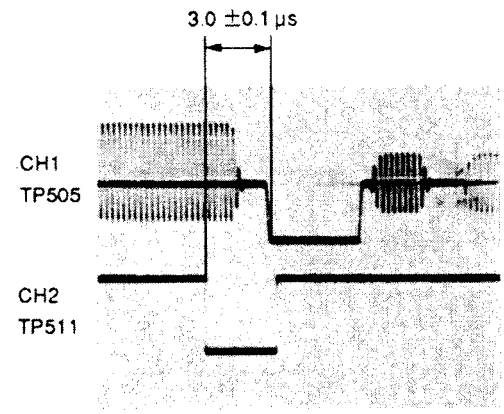
4-4-4. Burst Gate Pulse Width Adjustment

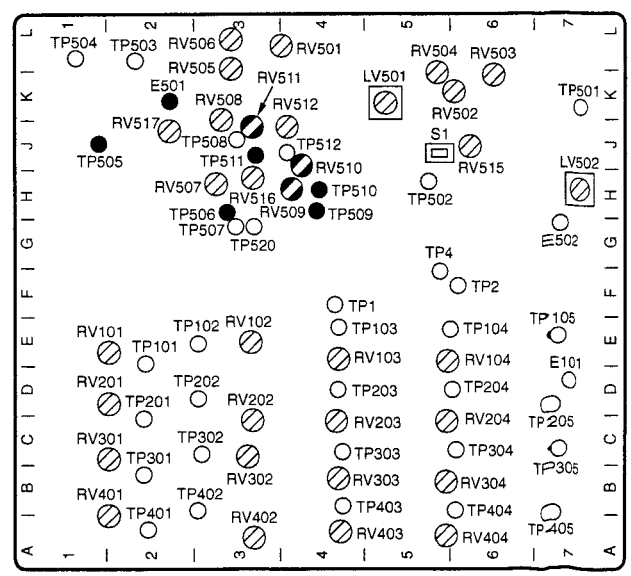
Equipment: Oscilloscope
Test point: CH 1: TP505 (GND: E501)/
PR-170 (N)/(P) board
CH 2: TP510 (GND: E501)/
PR-170 (N)/(P) board
Trigger: HD (TP506/PR-170 (N)/(P) board)
Adjustment point: ⊘RV510/PR-170 (N)/(P) board
Specification: 8.6 ±0.1 µs



4-4-5. SYNC Cleaning Pulse Phase Adjustment

Equipment: Oscilloscope
Test point: CH 1: TP505 (GND: E501)/
PR-170 (N)/(P) board
CH 2: TP511 (GND: E501)/
PR-170 (N)/(P) board
Trigger: HD (TP506/PR-170 (N)/(P) board)
Adjustment point: ⊘RV511/PR-170 (N)/(P) board
Specification: 3.0 ±0.1 µs

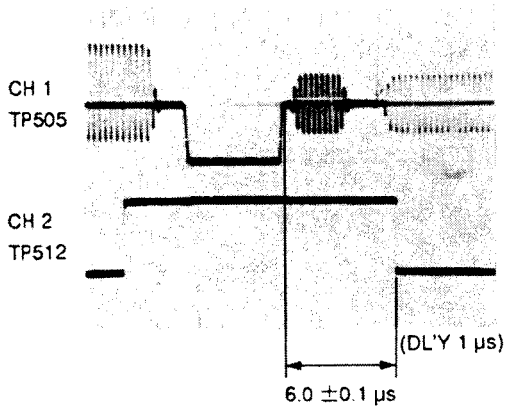




PR-170 board (Component Side)

4-4-6. SYNC Cleaning Pulse Width Adjustment

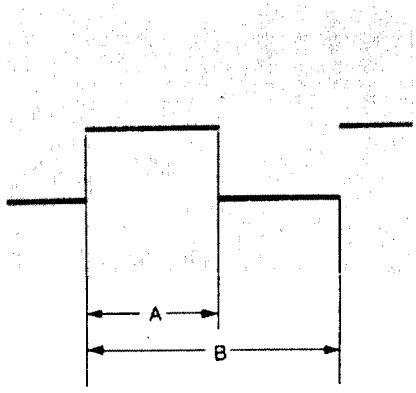
Equipment: Oscilloscope
Test point: CH 1: TP505 (GND: E501)/PR-170 (N)/(P) board
CH 2: TP512 (GND: E501)/PR-170 (N)/(P) board
Trigger: HD (TP506/PR-170 (N)/(P) board)
Adjustment point: ⊘RV512/PR-170 (N)/(P) board
Specification: 6.0 ±0.1 µs



4-4-7. 1/2 Killer Adjustment

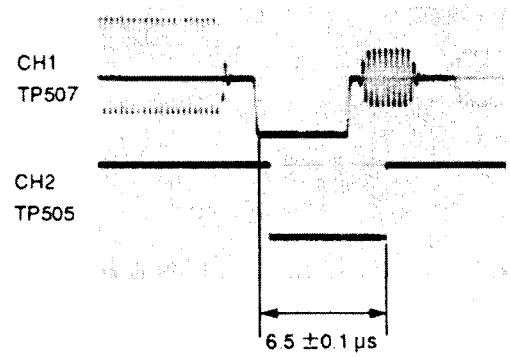
Equipment: Oscilloscope
Test point: TP520 (GND: E501)/PR-170 (N)/(P) board
Adjustment point: ⊘RV516/PR-170 (N)/(P) board
Specification: A/B = 55 $^{+10}_{-0}$ %

- Adjust the time axis control knob of the oscilloscope and match the output waveform "A" to 10 graduations.



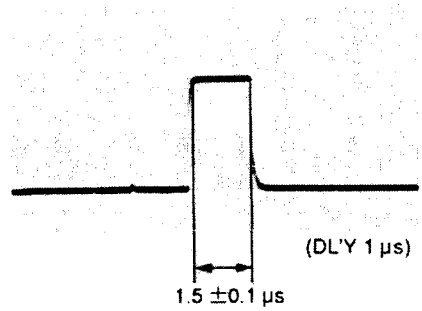
4-4-8. Clamp Pulse Phase Adjustment

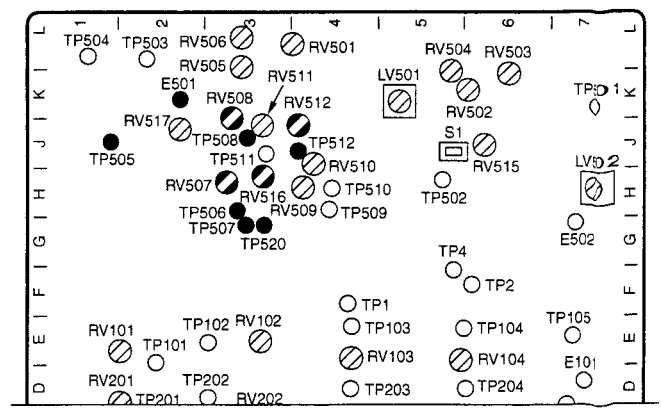
Equipment: Oscilloscope
Test point: CH 1: TP507 (GND: E501)/PR-170 (N)/(P) board
CH 2: TP505 (GND: E501)/PR-170 (N)/(P) board
Adjustment point: ⊘RV507/PR-170 (N)/(P) board
Specification: 6.5 ±0.1 µs



4-4-9. Clamp Pulse Width Adjustment

Equipment: Oscilloscope
Test point: TP508 (GND: E501)/PR-170 (N)/(P) board
Adjustment point: ⊘RV508/PR-170 (N)/(P) board
Specification: 1.5 ±0.1 µs

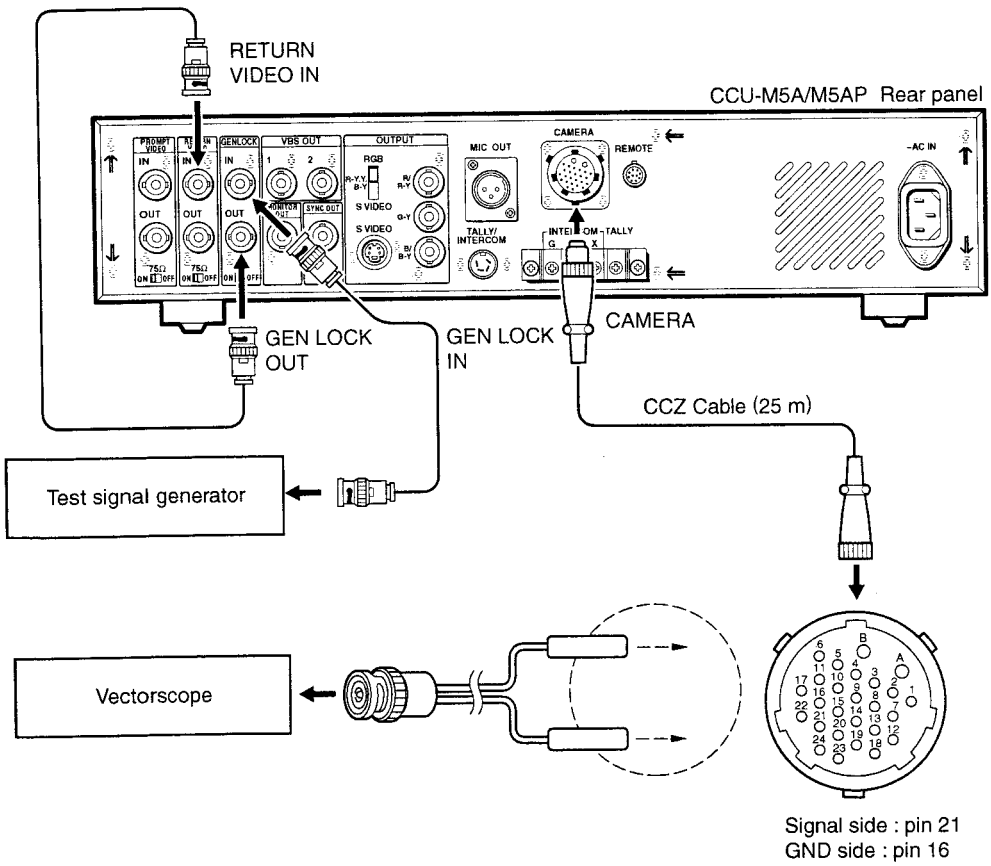




PR-170 board (Component Side)

Connection diagram:

(Perform the adjustment in the following connection as for sections 4-4-10 to 4-4-13.)



Preparation:

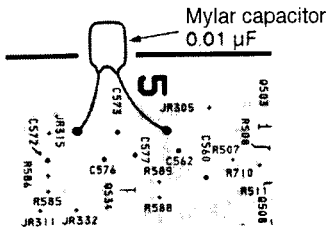
1. Set the 75 Ω TERMINATION switch (rear panel) of GENLOCK IN/OUT to OFF.
2. Input a color bar signal.

4-4-10. BIAS Adjustment

Step 1. BIAS-1 adjustment

Note:
Perform this adjustment after connecting the pin 5 of IC15 (L5)/PR-170 (N)/(P) board to GND via Mylar capacitor of 0.01 uF in order to eliminate the output from the 90° phase shifter.

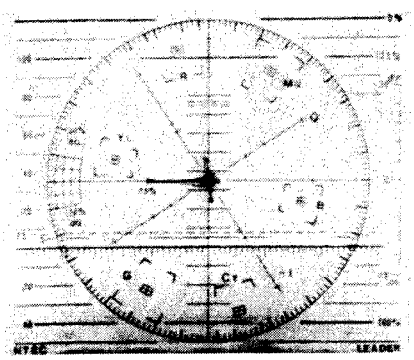
Solder side



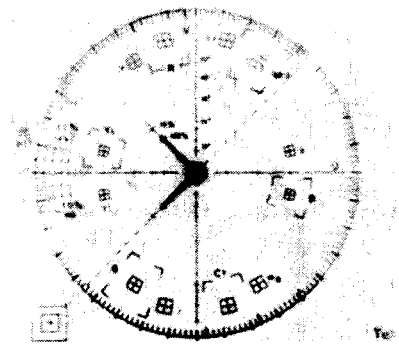
Equipment: Vectorscope
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘RV503/PR-170 (N)/(P) board

Adjustment procedure:
When ⊘RV515 (GAMMA SET)/PR-170 (N)/(P) board is turned fully clockwise and counterclockwise, each chroma level becomes low.
Adjust ⊘RV503 so that the chroma levles become minimum and same level when ⊘RV515 is turned fully clockwise and counterclokwise.

[for NTSC]



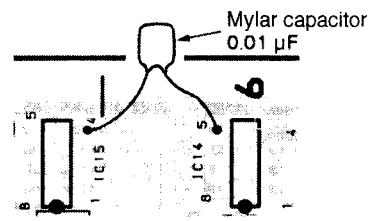
[for PAL]



Step 2. BIAS-2 adjustment

Note:
Perform this adjustment by connecting the pin 5 of IC14 (L5)/PR-170 (N)/(P) board to GND via Mylar capacitor of 0.01 uF in order to eliminate the output from the 90° phase shifter.

Component side

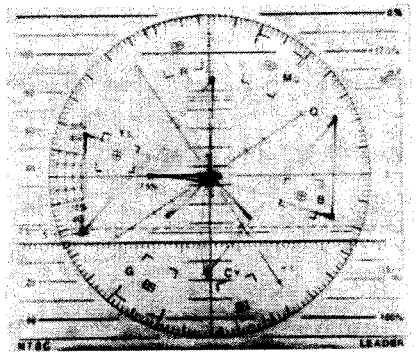


Equipment: Vectorscope
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘RV504/PR-170 (N)/(P) board

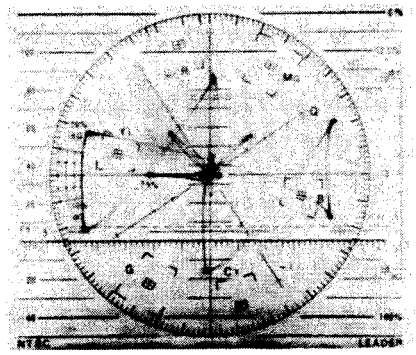
Adjustment procedure:
1. Set ⊘RV515 (GAMMA SET)/PR-170 (N)/(P) board to the mechanical center, and adjust temporarily with ⊘RV504 so that the chroma level becomes minimum.
2. Adjust ⊘RV504 so that the chroma levels when ⊘RV515 is turned fully clockwise and counterclockwies become the same.

[for NTSC]

When fully counterclockwise

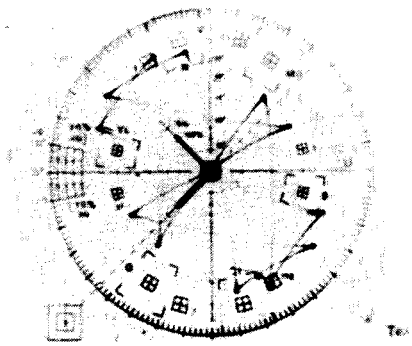


When fully clockwise

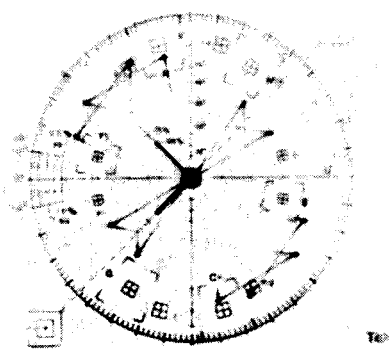


[for PAL]

When fully counterclockwise



When fully clockwise

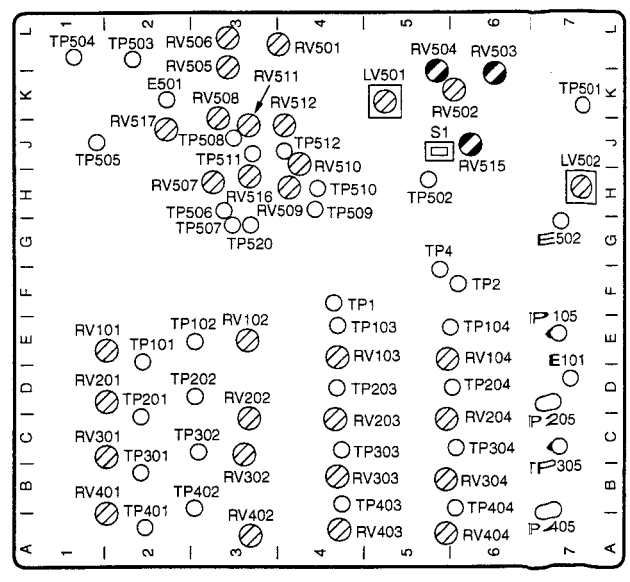


Note

After adjustment, disconnect the Mylar capacitor of 0.01 μF.

Setting after adjustment:

●RV515 → Mechanical center



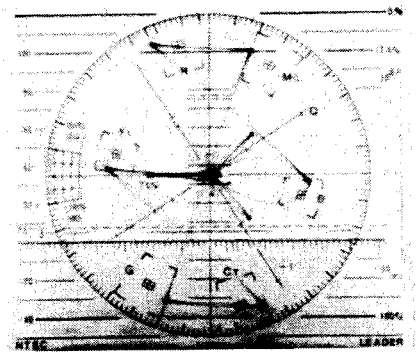
PR-170 board (Component Side)

4-4-11. Gamma Adjustment

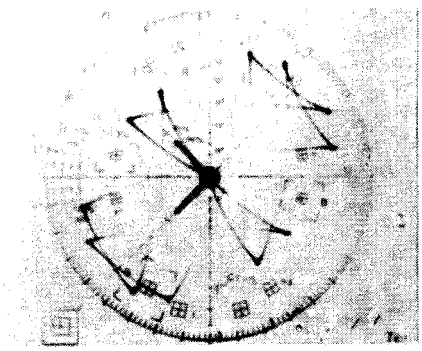
Equipment: Vectorscope
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ◓RV502/PR-170 (N)/(P) board

Adjustment procedure:
Adjust ◓RV502 so that the chroma levels become the same when ◓RV515 (GAMMA SET) is set to the mechanical center, fully clockwise, or fully counterclockwise.

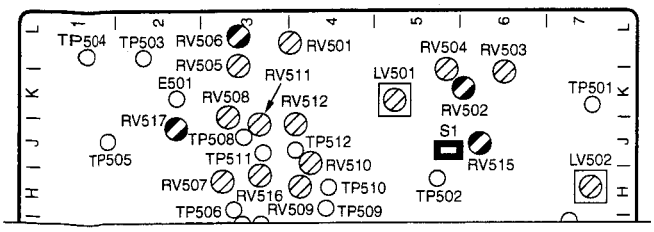
[for NTSC]



[for PAL]



Setting after adjustment:
◓RV515 → Mechanical center
S1 (ADJ/OPE) switch → OPE position



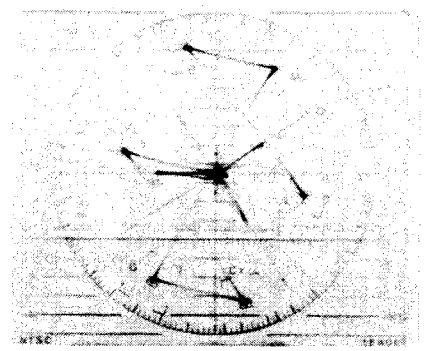
PR-170 board (Component Side)

4-4-12. Chroma Level Adjustment

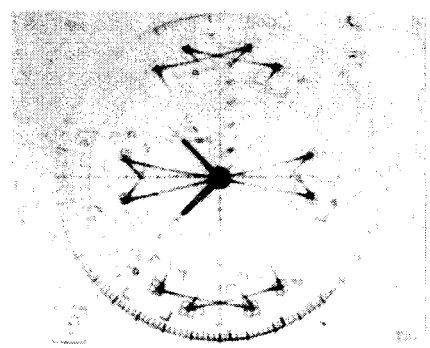
Equipment: Vectorscope
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ◓RV517 (burst level)
◓RV506 (chroma level)
Specification: Burst level 75 ±5 %
Within the chroma spot "⊞"

Adjustment procedure:
1. Adjust the "PHASE" control of the vectorscope so that the burst spot of the vectorscope is located on the 75 % axis.
2. Adjust ◓RV506 so that the chroma spot is located within the area "⊞" specified by each color.
3. Adjust ◓RV517 so that the burst spot is located on the 75 % axis.

[for NTSC]

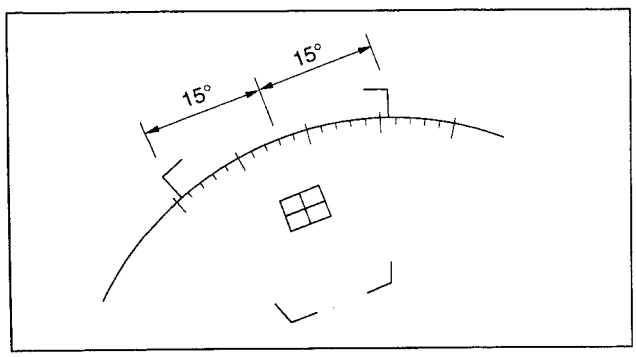


[for PAL]



4-4-13. SC Phase Adjustment

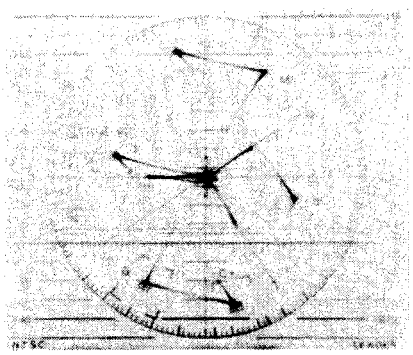
Equipment: Vectorscope
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘LV502/PR-170 (N)/(P) board
⊘LV501/PR-170 (N)/(P) board
Specification: ±15° against the frame center.



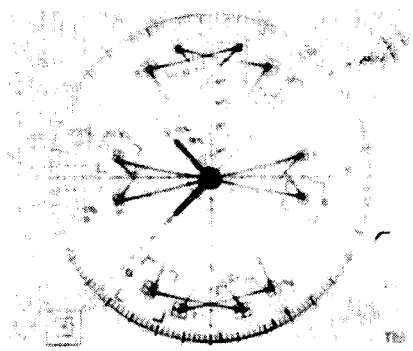
Adjustment procedure:

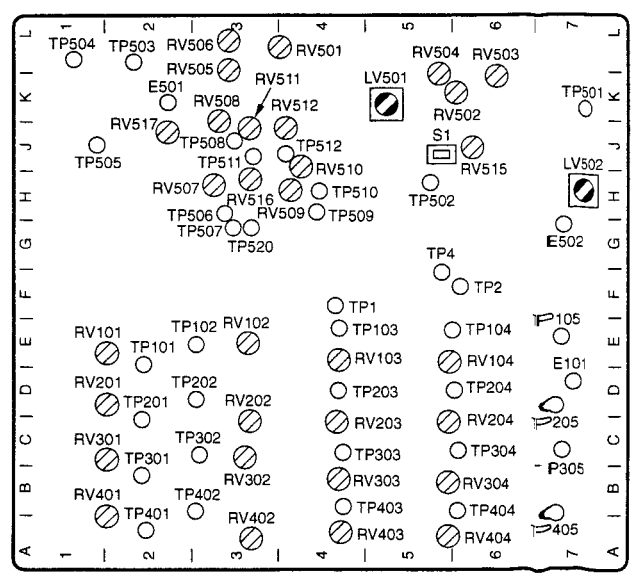
1. Turn ⊘LV502 (0/ø PHASE) fully clockwise ↻ and turn counterclockwise ↺ twice.
2. Adjust ⊘LV501 so that only the vector phase is lacated within the specified area (±15°) of each color.

[for NTSC]



[for PAL]

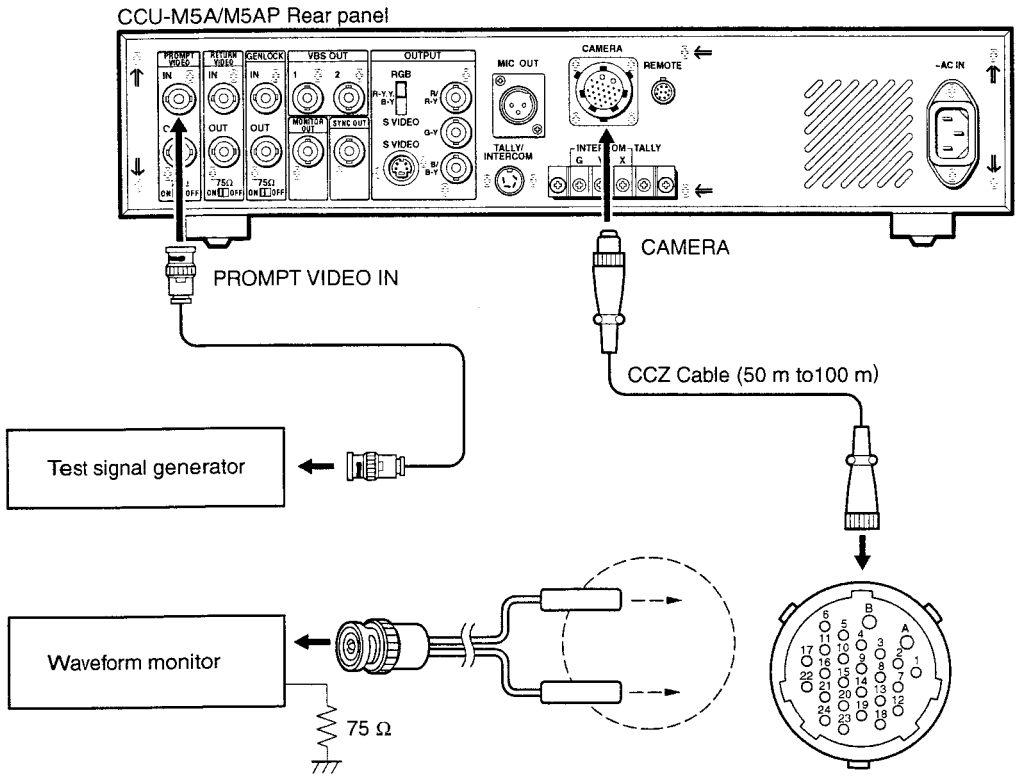




PR-170 board (Component Side)

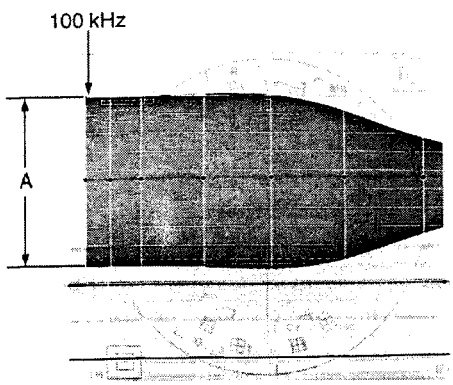
4-5. PROMPT Video System (VA-201 Board) Adjustment

Connection diagram:

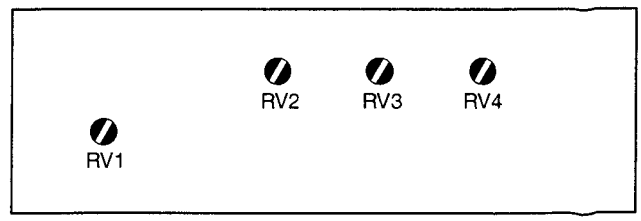


Video signal:

Output signal/test signal generator: SWEEP signal with sync



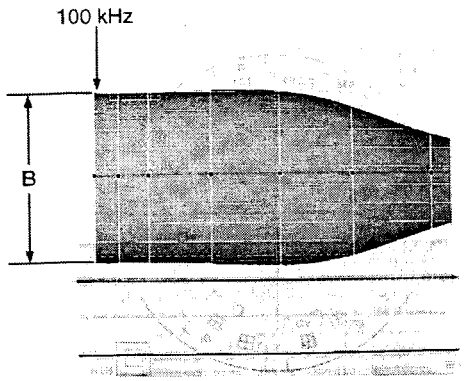
* Measure the level "A" of 100 kHz and record it.



VA-201 board (Component Side)

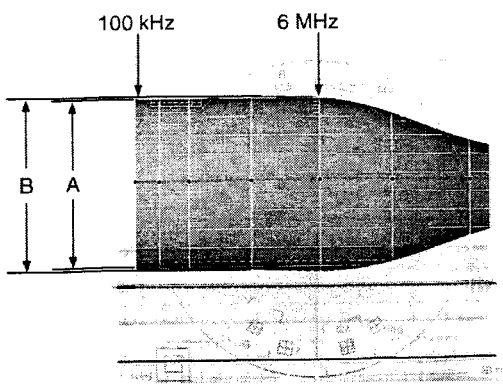
4-5-1. PROMPT Video Level Adjustment

Equipment: Waveform Monitor (WFM)
CCZ cable length: 50 m
Preparation: CABLE COMP selector/
Front panel → [50 m]
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘RV1/VA-201 board
Specification: B = A ±2 %
(B...100 kHz level of output signal)



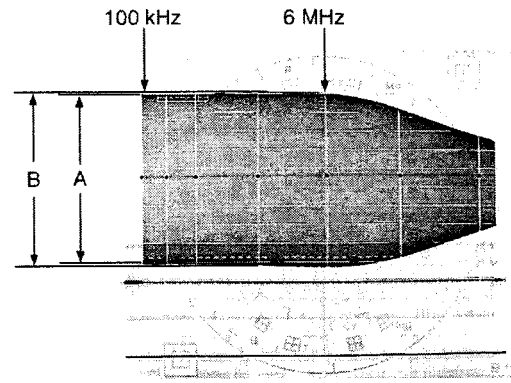
4-5-2. PROMPT Video Cable Compensation Adjustment 1

Equipment: Waveform Monitor (WFM)
CCZ cable length: 50 m
Preparation: CABLE COMP selector/
Front panel → [50 m]
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘RV4/VA-201 board
Specification: B = A ±6 %
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)



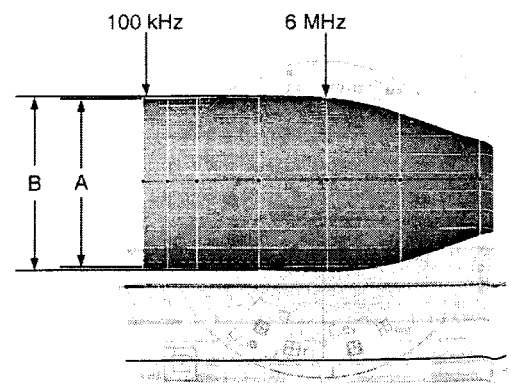
4-5-3. PROMPT Video Cable Compensation Adjustment 2

Equipment: Waveform Monitor (WFM)
CCZ cable length: 100 m
Preparation: CABLE COMP selector/
Front panel → [100 m]
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘RV3/VA-201 board
Specification: B = A ±6 %
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)



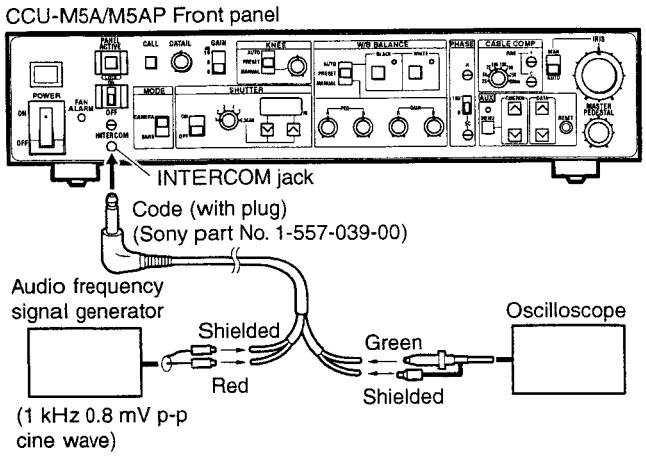
4-5-4. PROMPT Video Cable Compensation Adjustment 3

Equipment: Waveform Monitor (WFM)
CCZ cable length: 250 m
Preparation: CABLE COMP selector/
Front panel → [250 m]
Test point: CCZ connector pin 18
(GND: CCZ connector pin 19)
Adjustment point: ⊘RV2/VA-201 board
Specification: B = A ±6 %
(A...100 kHz level of output signal)
(B...6 MHz level of output signal)



4-6. Intercom System Adjustment

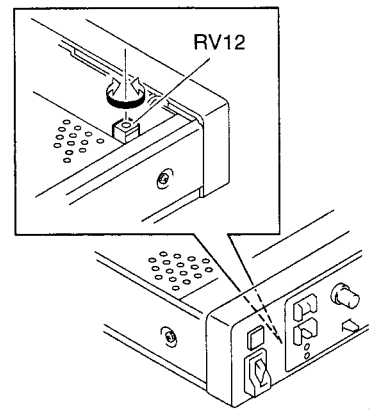
Connection diagram:



4-6-1. INCOM SIDE TONE Adjustment

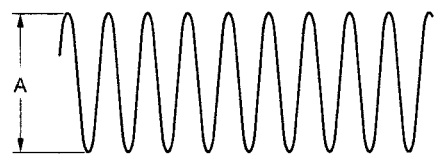
Preparation:
INTERCOM control/front panel → Clockwise ↻

Equipment: Oscilloscope
Test point: INTERCOM jack output/front panel

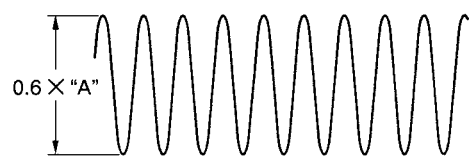


Adjustment Procedure:

1. Turn the ◐RV12/IF-374 board fully counterclockwise, and measure the level "A" of the INTERCOM jack output.



2. Adjust ◐RV12/IF-374 board so that the level of INTERCOM jack output becomes 60 % of the level "A" in step 1.



SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

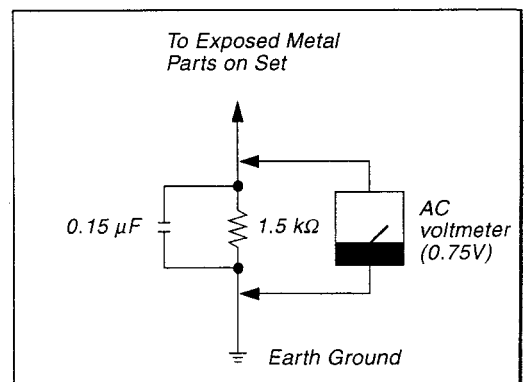


Fig A. Using an AC voltmeter to check AC leakage.

CCU-M5A (UC)
CCU-M5AP (CE) E
9-955-230-11

Sony Corporation
Communication System Solutions Network Company

Printed in Jap an
2000. 5 08
©20 00